ORIGINAL

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Cover: The cover illustrates a portion of the Ebers Papyrus which provides an account of the practice of medicine and health care in ancient Egypt and a statue of Imhotep, the Egyptian God of Medicine.

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INTRODUCTION

This is the report of the fourth phase of Project 03-337-C, "Laboratory Management Techniques in Health Care," conducted by representatives of the Centers for Disease Control, Public Health Service, Department of Health and Human Services, United States of America, for the Ministry of Health, Cairo, Arab Republic of Egypt. The agreement for the conduct of this project is described under section 104(b)(3) of Public Law 83-480, as amended, and Public Law 86-610, section 3. The period of agreement for this project, including amendments, is from August 1978-August 1983.

This report brings into focus more explicitly the necessary role of the laboratory in the delivery of health services in Egypt. Previous phases of the project dealt with an overview and analysis of both the Ministry of Health laboratory function as well as that of selected governates. Conditions and needs of these functions were previously described in considerable detail. Of significance, is that three governates--with varying differences in their needs for delivery of health services--and located in diverse areas of the country--were selected for study with the expectations that the results would serve as a prototype for the entire country. The United States Project Team feels that this was accomplished and the results to date are shown in detail in the reports of the second and third phases of the project done on site in Egypt on February 19 - March 9, 1979 and November 3-21, 1980 respectively. The first phase, accomplished in January 1979 served as a planning phase only, and a formal report was not prepared. An informal planning document was prepared and presented to the Egyptian members of the project in January 1979.

Major emphasis in this report, then, is placed on the determination of what-and-how laboratory services should be provided to best serve the health needs of the people at <u>all</u> levels of health services delivery in the country (from the lowest level of primary care such as that for a rural health unit to the highest level such as a general hospital or specialty hospital (e.g., eye, fever, chest). This determination is based on a management methodology utilizing "service level" criteria developed during the second and third phases of this project by the United States Project Team. In essence,

test procedures, related methodologies, general equipment and facility needs, and personnel qualifications are recommended for each facility level so as to provide the medical staff with the best laboratory support possible. A major premise is that if more complete and immediate attention is given to patient care at the lowest facility levels, then patient care requirements and related higher costs will be reduced by reducing demands at the higher facility levels - especially at the district and general hospitals. Furthermore, less morbidity and mortality should result for the country as a whole, after a reasonable period of time of implementation.

The Egyptian members of the project who served in this fourth phase included the following:

Dr. Amin El Gamal, Principal Investigator, Under-Secretary for Medical Care and Emergencies, Ministry of Health, Cairo

Dr. Safwat Mohieldin, Co-Principal Investigator, Director General, Central Public Health Laboratories, Cairo. (The death of Dr. Mohieldin during the last visit by the United States Project Team is deeply regretted and his contributions will surely be missed).

Dr. Malek Mahmoud El Nomrossy, Consultant in Statistics, Cairo

Dr. Zaher Iskander Habib, Statistical Function, Ministry of Health, Cairo

Dr. Munir Atia, Ministry of Health, Cairo

Dr. Mokhtar Mahmoud Hamza, Director General, Beni Sue Health Directorate

Dr. Samir Gad El Sayed, Director, Joint Laboratories, Beni Suef

Dr. Sabry Fahim Banoub, Regulatory Function for Private Laboratories, Ministry of Health, Cairo

Michel Messiha Sidaros, Venereal Disease Function, Central Public Health Laboratories, Cairo

Engineer Shehata Ayad Atalla, Chief, Engineering Function, Central Public Health Laboratories, Cairo

Dr. Nawara Yacoub, Director, Microbiology Laboratories, and Deputy Director, Division of Preventive Medicine (and Epidemiology), Port Said Health Directorate

Dr. Fatoua, Director General, Port Said Health Directorate

In addition, the United States Project Team conferred on site with Dr. Elias Dib Aziz, Director, Gharbia Governate Laboratories and Dr. Latifa Hachem Hassen, Deputy Director of the Gharbia Governate Laboratories in regard to use of the service level criteria methodology in Gharbia. This visit was made after initial on-site visits to Beni Suef and Port Said. Also, a visit was made to Dr. Nasr Diab, the Director General of the Gharbia Health Directorate so as to ensure his participation in the service levels approach as well as his thoughts regarding the Governate's system for epidemiology. Since he was out of the country, this participation was provided by Dr. Shawky Sayed Mohammed, Deputy Director General, and his staff.

On February 14 and 15, the United States Project Team visited the Eastern Mediterranean Regional Office (EMRO) of the World Health Organization (WHO) in Alexandria. This was done to apprise EMRO officials of the progress of the project since certain officials visiting the Centers for Disease Control from EMRO were interested in the national laboratory/epidemiology approach that might could be utilized elsewhere in the Region. Key personnel contacted in EMRO included Dr. Farouk Partow, Director of Communicable Diseases Control Program, Dr. Muhammed Wahdan, Epidemiologist, and Dr. Hashmi, Laboratory Services Supervisor.

As requested, organization charts for the Ministry of Health, Central Public Health Laboratories, and other charts as applicable are updated herein. This is done in order to inform readers of this report of progress in explanation of previous organizational recommendations as well as to show the effect on previous governmental changes.

Finally, this report provides a brief review or update of epidemiology practices in the governates with recommendations for improvement. Particular emphasis is placed on the laboratory-epidemiology interface--especially as related to laboratory service levels.

FINDINGS AND RECOMMENDATIONS

Update of Ministry of Health and Central Public Health Laboratories (Cairo) Organizational Structure

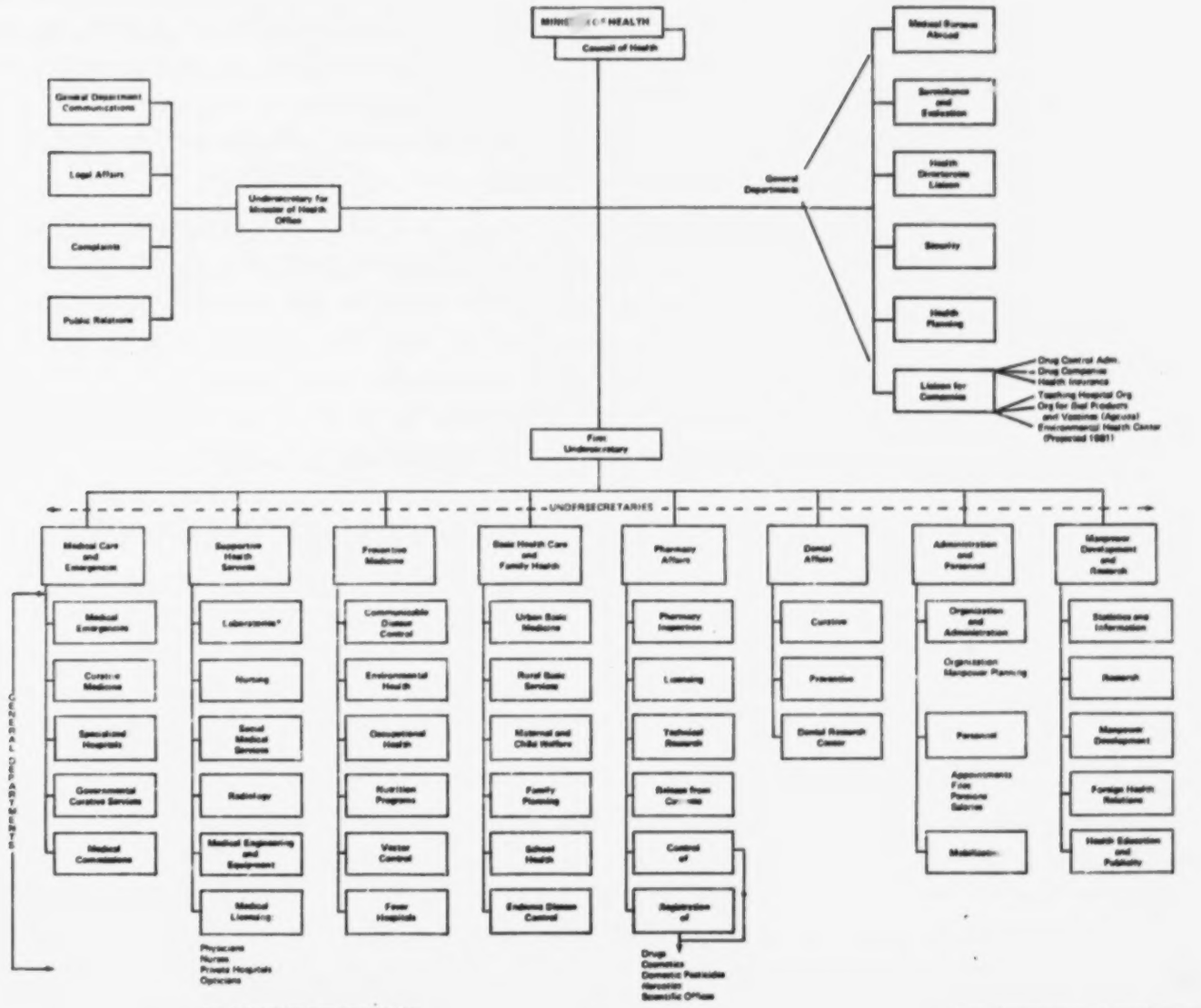
Certain distinct changes in the organizational structure of the Ministry of Health and the Central Public Health Laboratories (CPHL) are in the process of being implemented or are contemplated so as to strengthen the Ministry's emphasis on prevention. Some of these changes involve implementation of previous recommendations as agreed between the United States Project Team and its Egyptian counterparts. The current Ministry of Health organization chart is shown in Figure 1. The current CPHL organization chart is shown in Figure 2. The proposed organizational chart for the CPHL is shown in Figure 3. Changes that are in process and reasons for these changes are:

1. The Laboratories function shown under the Undersecretary for Supportive Services will be transferred in the near future to the Undersecretary for Preventive Medicine (See Figure 1). This will be done so as to combine the laboratory function with those Preventive Medicine functions in which it provides diagnostic and related support such as Communicable Disease Control, Environmental Health, Occupational Health, etc. This, however, probably will serve only as an interim step to an optimum laboratory function configuration (see 4. below).

2. An organizational entity or block for Epidemiology under the Undersecretary for Preventive Medicine is contemplated for the near future. This will serve to give the Ministry's Epidemiology function, which is somewhat incomplete at the present time, more emphasis and visibility (See Figure 1). This entity and its placement was recommended in the United States Project Team's report of November 3-21, 1980.

3. The Epidemiology Liaison functions recommended in the proposed organization and general functions for the CPHL will be implemented in the near future. Figure 3 shows the general functions under the organizational block for "Epidemiology Liaison". This entity was recommended in both the second and third phase reports by the United States Project Team.

Present Organization—Ministry of Health—Cairo, Egypt
February 1982



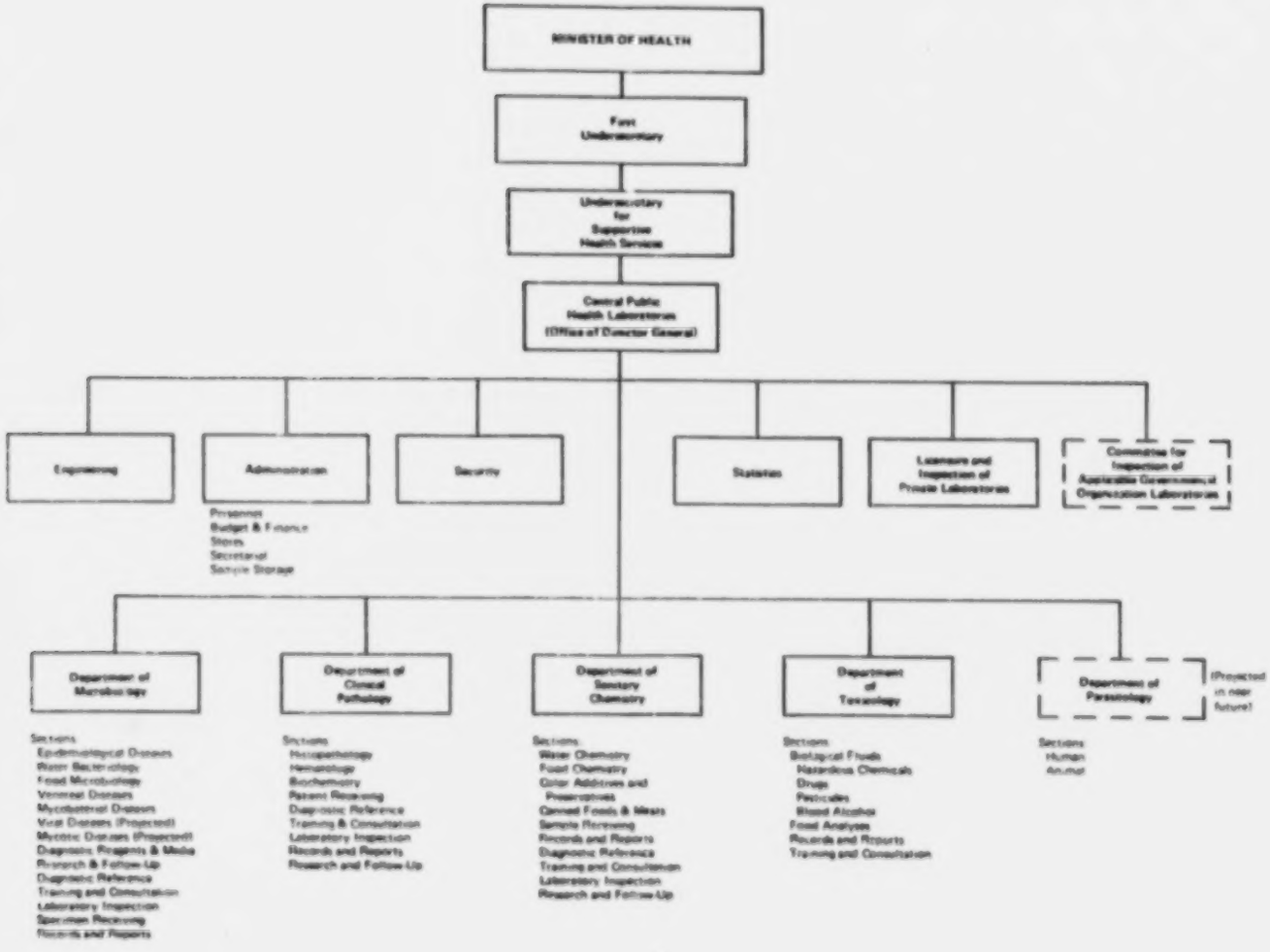
*Includes Central Public Health Laboratories, Cairo

Source: Undersecretary for Medical Care and Emergencies

Figure 1

Present Organization and General Functions of Central Public Health Laboratories

Cairo, Egypt
February 1982



Source: Director General, Central Public Health Laboratories, Cairo

Figure 2

Update of Proposed Organization and General Functions
Central Public Health Laboratories
Cairo, Egypt
February 1982

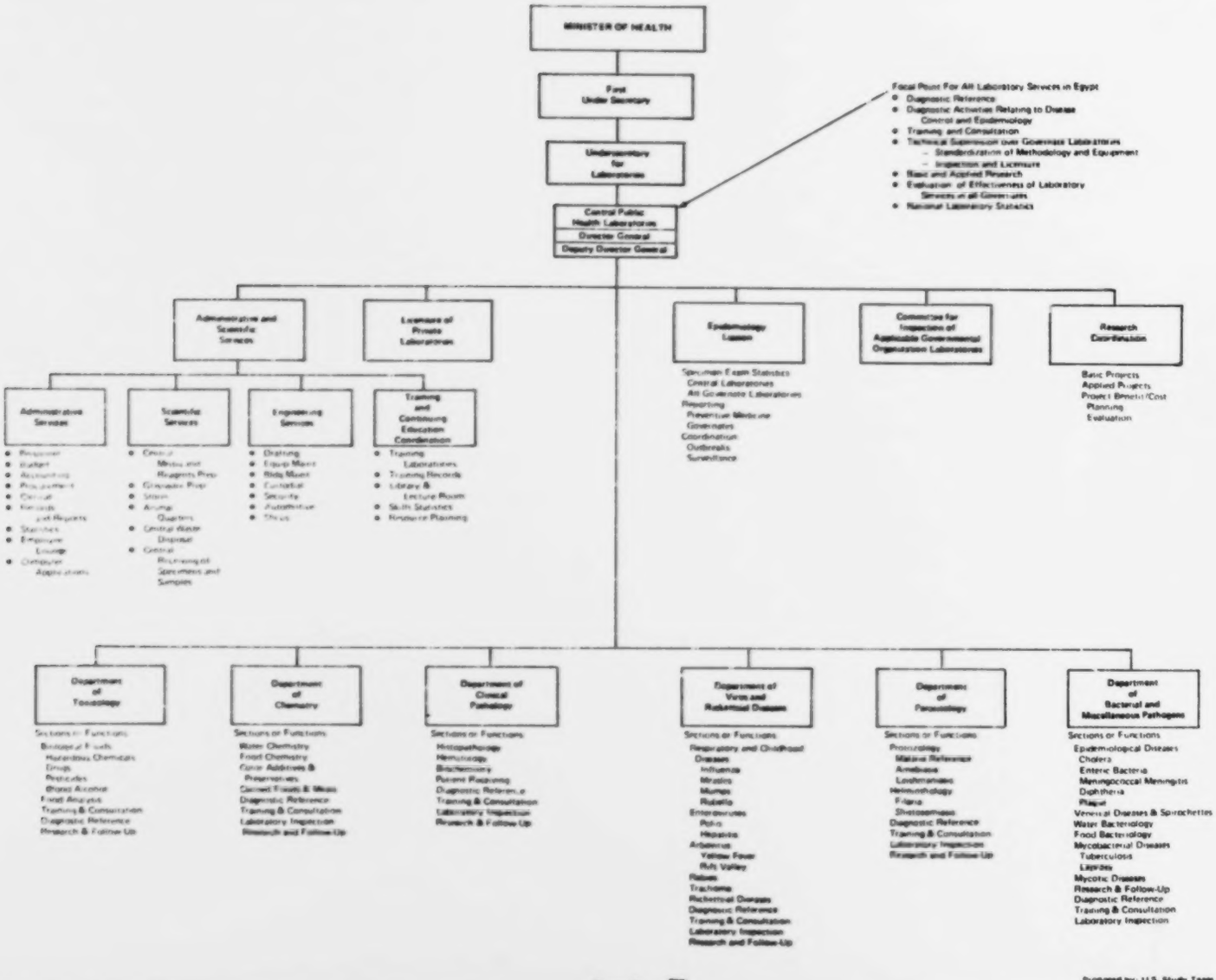


Figure 3

Proposed by: U.S. Study Team

4. An Undersecretary for Laboratories function with appropriate laboratory functions assigned is contemplated for the Ministry of Health at some time in the near future. This is deemed necessary to provide the nation's laboratory function with the proper visibility and placement at a level depicting the laboratories' functional interrelationship with several Undersecretary entities. For example, in Figure 1, the laboratories function now provides service and technical support to major functions in the Undersecretaries for Preventive Medicine (see discussion in 1 above), Medical Care and Emergencies, Basic Health Care and Family Health, and other organizations as applicable. This organizational recommendation was made by the United States Project Team in their report of November 3-21, 1980 and is depicted in Figure 3.

Other organizational changes were discussed, but more thought and deliberation must take place prior to any action taken--not only due to the effect on the total health care delivery system regarding e.g., health care facilities such as combining and closing--but the political and fiscal impact as well. Health care facilities by type and their impact on recommended laboratory service levels will be discussed further in this report.

At this time it is strongly recommended that the organizational changes discussed above be implemented as soon as possible.

Establishment of Laboratory Service Levels in Levels I-IV Health Care Delivery Facilities

Medical and public health care is made available to all Egyptian citizens through a progressive network of health care facilities in which a patient may receive treatment or other health services or be referred to a higher level facility as the need arises. Basically, this system is composed of four levels of treatment or health related services. These levels, Levels I-IV, are described as follows:

Level I: Includes the lowest or first level facilities which offer routine primary medical and other services to the preponderance of the population. These facilities are so dispersed and in such adequate numbers that the general population has easy access to receive care other than for the more complicated problems. In essence, the

overall basic philosophy is to take health care to the people. This level includes such facilities as the rural health unit, rural health center, rural hospital, maternal and child health unit or center, and the school health unit or center. Most of these facilities are usually located in the rural and smaller city areas. Health centers and clinics and related facilities located in the urban areas can also be included in this level. Laboratories serving these facilities which are usually on the premises are also classified as Level I. Table I depicts the number of medical and health services facilities located throughout Egypt. Of significance is the number of Level I facilities listed. Figure 4 shows an example of facility dispersion in Gharbia governate. It should be noted that most of these facilities are no more than 5-10 kilometers apart. Of some significance is the laboratory support provided by Level I facilities. Table II shows that 78 percent of all tests and procedures performed in Beni Suef governate were done in Level I facilities. This, too, is indicative of the number of patients receiving care in Level I facilities in Beni Suef.

Level II: Represents the next referral level or next level of treatment--especially for inpatients. The district hospital is considered the primary facility at this level and its medical staff is composed of several subspecialties so as to provide more advanced treatment than can be provided e.g., at a rural health center (with beds) or at a rural hospital. In this regard, more advanced laboratory support is required at this level than is provided at Level I facilities. The United States Project Team found, however, that of several district hospitals visited in three governates, the laboratory service levels were insufficient for proper support of the medical staff.

Level III: Represents the most advanced referral level in a governate--except for certain specialty hospitals which will be discussed below or the limited number of the highly specialized and advanced treatment centers in Cairo and Alexandria. The general or principal governate hospital and its laboratory located within the

TABLE I

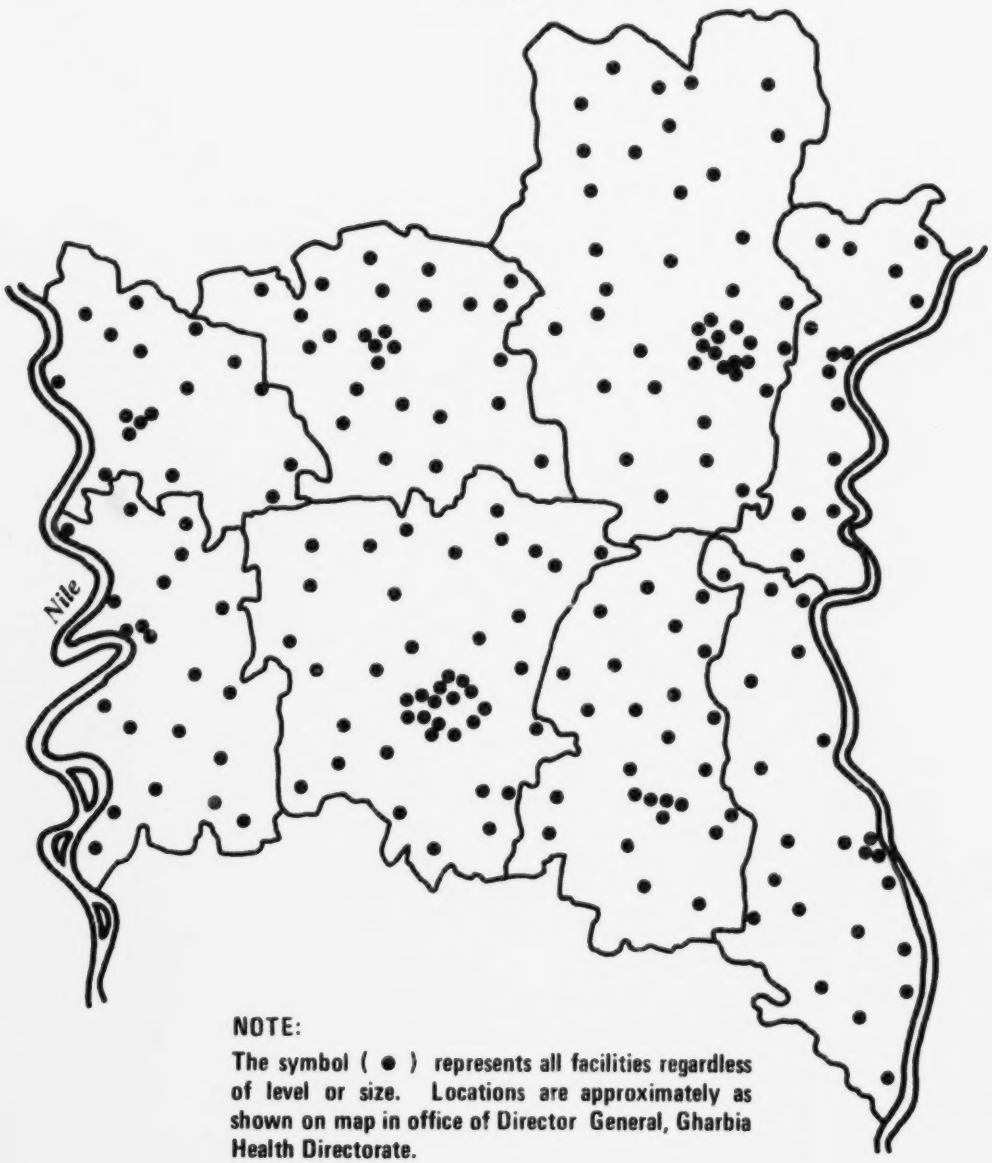
HEALTH FACILITIES BY TYPE
Ministry of Health
Egypt - 1981

Facility	w/o Beds	w/Beds	No Beds
General & District Hospitals	2	169	21,149
Chest Disease Sec in Gen Hosp	-	5	26
Psychiatric Sec in Gen Hosp	7	13	167
Eye Disease Sec in Gen Hosp	18	117	1,337
Infectious Disease Sec in Gen Hosp	-	9	155
Endemic Disease Sec in Gen Hosp	23	114	865
Leprosy Sec in Gen or Dist Hosp	30	-	-
Skin Disease Sec in Gen Hosp	56	6	32
Obstetric & Pediatric Hospitals	-	3	376
Chest Disease Hospitals	-	35	7,192
Infectious Disease Hospitals	-	73	6,683
Endemic Disease Hospitals	17	15	125
School Health Hospitals	-	5	562
Leprosy Hospitals & Clinics	11	3	1,789
Skin Disease Hospitals & Clinics	15	1	80
Eye Disease Hospital (or Unit)	4	30	1,532
Polyclinics	16	-	-
District Clinics	132	-	-
Chest Dispensaries	54	16	307
Psychiatric Units	5	9	6,484
School Health Polyclinics	55	-	-
School Health Units	206	-	-
Maternal & Child Health Centers	23	213	425
Urban Health Centers	59	-	-
Rural Health Centers	-	549	7,694
Rural Health Units	1,880	-	-
Rural Health Hospitals	-	39	1,111
Quarantine Centers	13	9	295
Laboratories	150	-	-
Dental Units	1,274	-	-
Cancer Institute	-	1	72
Health Bureaus	342	-	-
Health Education Centers & Museum	85	-	-

Source: General Dept. of Statistics & Evaluation - Ministry of Health

FIGURE 4

DISPERSION OF HEALTH CARE DELIVERY FACILITIES
IN GHARBIA, GOVERNATE, EGYPT
February 1982



NOTE:

The symbol (●) represents all facilities regardless of level or size. Locations are approximately as shown on map in office of Director General, Gharbia Health Directorate.

TABLE II

DISTRIBUTION OF LABORATORY WORKLOAD BY HEALTH FACILITY
Beni Suef - 1981

Test or Procedural Area	Rural Health Units or Centers	School Health Units	Maternal & Child Health Centers	Rural Hospitals	Endemic Disease Unit	Fever Hospital	Chest Hospital	Chest Dispensary	Medical Center	Malaria Laboratory	District Hospitals*	Polyclinics (Outpatients for General Hospital)	General** Hospital	Total
Urinalysis	194,038	94,380	93,530	107,225	52,958	1,372	--	--	4,105	--	44,242	--	--	--
Hemoglobin	194,038	80,125	568	100,250	--	--	--	--	--	--	44,100	1,714	--	--
Stools	129,536	90,155	--	77,217	48,983	61	--	--	4,105	--	42,930	--	--	--
VDRL Venipuncture	--	--	906	--	--	--	--	--	--	--	--	--	--	--
Complete Blood Count	--	--	--	--	--	170	60	--	--	--	--	--	--	--
Sedimentation Rate	--	--	--	--	--	169	10	--	--	--	--	1,600	--	--
Malaria Film	--	--	--	--	--	116	--	--	--	43,447	--	56	--	--
Ziehl Neilson	--	--	--	--	--	--	657	5,559	--	--	--	--	--	--
Culture & Sensitivity	--	--	--	--	--	--	1,270	--	--	--	--	--	--	--
Other Hematology	--	--	--	--	--	--	--	--	--	--	--	4,738	--	--
Blood Chemistry	--	--	--	--	--	--	--	--	--	--	--	4,485	--	--
TOTAL	517,612	264,660	95,004	284,692	101,441	1,888	1,997	5,559	8,210	43,447	131,272	12,593***	19,663	1,488,038
Percent of Total	78				11						11			100

NOTES:
*Includes workload of Endemic Disease Unit in hospital.
** Not broken down due to need for brevity (see report of November 3-21, 1980 for detailed breakdown).
*** Polyclinic laboratory work done by general hospital laboratory.

Source: Statistical Function - Beni Suef Health Directorate

facility is considered a Level III facility. In regard to referral laboratories, the governate or joint laboratories are considered a Level III facility. The general hospital's medical staff is composed of a greater number of subspecialties than a district hospital, and for the most part, should provide more advanced or sophisticated treatment than can be provided in a district hospital. In this regard, even more advanced laboratory support is required at this level than is provided in the district hospital. The United States Project Team and their Egyptian counterparts agree, however, that present laboratory service levels are insufficient for proper support of a good general hospital.

Level IV: Represents specialty referral hospitals such as that for eye, chest, and fever hospital. Laboratory support varies according to the type facility or location and these laboratories are also classed as Level IV. (Laboratories in teaching and training centers are also classed as Level IV.)

In addition to the four levels above, the large referral hospitals in e.g., Cairo and Alexandria could be classed as Level V. Patients are referred from Level I-IV facilities to Level V facilities for such things as thoracic surgery, major cancer, heart, or brain surgery, and serious burn problems.

A System for Determining Laboratory Service Levels for Level I, II, III, and IV Health Care Facilities:

In previous reports for Phases II and III of this project, the need for better and additional laboratory support for all facility levels was recognized. Although the need for such improvement in the district, general and specialized hospitals (Levels II, III, and IV) has been discussed, the United States Project Team believes that the greatest opportunity for improvement lies in providing for significant changes in the Level I facility. Although improvements in Levels II-IV will be recommended, a concerted effort is made in this report for Level I facilities. This is because:

1. A basic philosophy in Egypt's health care delivery system is the focus on immediate accessibility of health care at the lowest possible level thus preventing as much as possible future more acute morbidity as well as the referral of patients to a higher level facility.

2. Laboratory support at this level facility at the present time is considered inadequate in both quantity and quality. Not only should additional testing be done but better methodologies of current testing should be used.

3. There is a great number of bright, young, and energetic physicians that are produced in Egypt and available to serve in the most basic facilities. It is the belief of the United States Project Team that these physicians could provide even better medical services to the masses--which is the basic intent of Level I facilities--if they had a more comprehensive laboratory service available.

In order to determine laboratory service levels to provide the above support, the United States Project Team, during previous visits, developed a management or systems approach to link service needs of a facility with certain management or operational criteria which most accurately relates to the conditions or requirements of the country's medical and health care delivery system. The approach, in three steps, is described as follows:

1. Identify appropriate management or operational criteria and list by category. Each criterion listed serves as a condition, gauge, benchmark, measure or yardstick to be used for judging the effects of this criterion on the operation of a health facility. This list, which is for the most part believed to be most inclusive for Egypt, is divided into five major criteria groupings:

I. Type Medical Services Rendered
II. Population Served
III. Management Considerations
IV. Legal or Professional Requirements
V. Public Health Considerations (Epidemiology or Disease Control)

Each criterion and sub-criterion applicable for each grouping follows:

I. Type Medical Services Rendered:
A. Screening:
1. Chronic Diseases:

Hypertension

Heart Disease

Diabetes

Cancer

Other

2. Endemic Diseases:

Tuberculosis

Schistosomiasis

Intestinal Parasites

Tetanus

Measles

Polio

Hepatitis

Cholera

Typhoid

Other

3. Routine:

Pre-Natal

Neo-Natal

Visual

4. Malnutrition

5. Other

B. Routine (and acute patient care):

1. Outpatient (includes screening and service above as deemed necessary):

a. Trauma:

Minor Accidents including burns (auto, home, farming, and industrial)

Major Accidents including burns (auto, home, farming, and industrial)

b. Minor Surgery:

c. Minor Illnesses:

Upper Respiratory

Gastroenteritis

Chronic Disease Maintenance

(1) TB Drug Maintenance

(2) Diabetes

(3) Hypertension

(4) Heart Disease Maintenance

(5) Other

Endemic Disease Maintenance

(1) Schistosomiasis

(2) Ascaris

(3) Hookworm

(4) Malaria

(5) Other

Other Routine

2. Inpatient:

a. Normal Delivery

b. Complicated Delivery

c. Minor Surgery

d. Major Surgery and Trauma (including burns)

e. Acute and Chronic Illness:

Upper and Lower Respiratory

Gastroenterology

(1) Stomach

(2) Intestines

(3) Pancreas

(4) Liver

(5) Renal

(6) Other

Cardiovascular

Other

II. Population Served:

Total Population Served

Estimated Patient Load (Daily)

Laboratory Workload

III. Management Considerations:

A. Availability of Trained Personnel:

1. Laboratory Helper
2. Laboratory Assistant
3. Laboratory Technician
4. Other

B. Physical Plant

1. Electricity
2. Telephone
3. Water
4. Gas
5. Equipment
6. Space
7. Housekeeping

C. Proximity of Higher Level Facility

D. Transportation of Patient

E. Other

IV. Legal or Professional Requirements:

A. Ministry and/or Governate:

1. Health Service
2. Staffing

V. Public Health Considerations:

A. Epidemiology

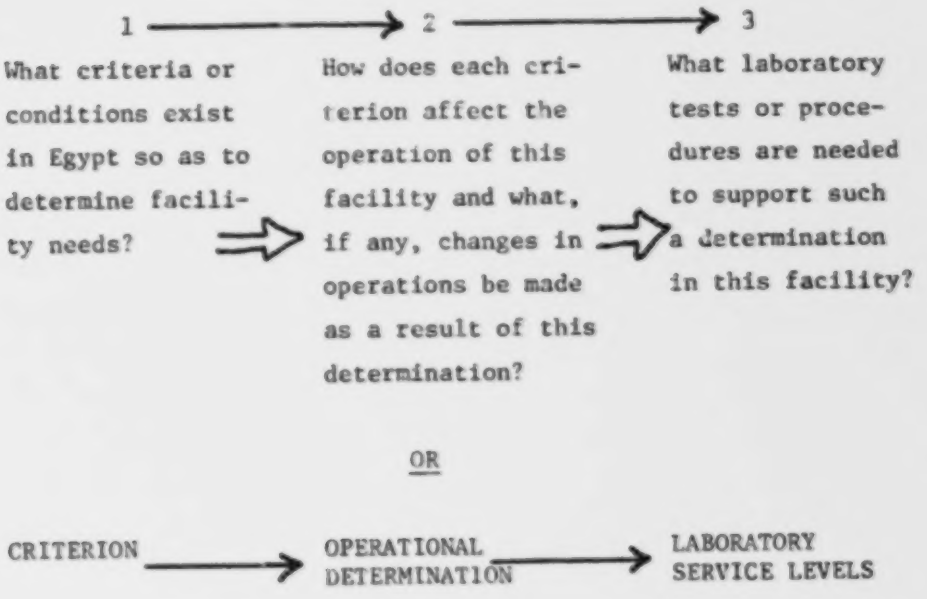
B. Disease Control

2. Determine how each criteria grouping, each criterion and/or each sub-criterion listed above affects the facility operation (operational determination) in regard to current and future needs. For example, when examining a particular medical service criterion, it may be found that although this criterion should directly affect the operation of a

particular facility nothing is done in the way of preventive measure or treatment of a patient. An example would be the prevalence of diabetes in a governate but needed diagnostic efforts--especially laboratory testing--are inadequate. An operational determination would describe what and why something should be done in regard to this criterion--or the criterion might not even apply to the facility. Furthermore, management considerations such as lack of trained personnel or inadequate facility plant or space might temporarily preclude a specific action being taken in consideration of a particular medical criterion.

3. Assign laboratory service levels. A list of test or procedures (or other considerations) is recommended as applicable to each operational determination.

A simple schematic depicting the flow of the above 3 step approach is:


1
2
3
What criteria or conditions exist in Egypt so as to determine facility needs?
How does each criterion affect the operation of this facility and what, if any, changes in operations be made as a result of this determination?
What laboratory tests or procedures are needed to support such a determination in this facility?
OR
CRITERION
OPERATIONAL DETERMINATION
LABORATORY SERVICE LEVELS

This management system or approach is presented for future use by Egypt--and necessary additions or deletions in both criterion and service levels can be accomplished by health officials concerned. The next several pages demonstrate the application of this system to Level I-IV facilities in Egypt. Facilities involved are for:

Level I

1. Rural Health Unit (w/o beds) and Rural Health Center (w/beds)
2. School Health Unit or Center
3. Maternal and Child Health Center (with or without beds)
4. Rural Hospital

Level II

1. District Hospital

Level III

1. General Hospital

Level IV

1. Eye Hospital
2. Fever Hospital
3. Chest Hospital

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Health Unit (w/o beds) and Rural Health Centers (w/beds)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
I. TYPE MEDICAL SERVICES RENDERED:		NOTE: At the present time the Rural Health (RHU) laboratory routinely performs testing for hemoglobin and urinalysis (sugar, albumin, O&P, red cells, pus cells, casts, and crystals) and as indicated, a stool for parasites on each outpatient and in-patient (RHU with beds).
A. Screening:		
1. Chronic Diseases:		
a. Hypertension	Present Services: Physician screens patient as deemed necessary. No lab tests presently done other than that for routine screening.	No other tests recommended other than routine now done.
	Additional Services for Consideration: None except for pregnant women. See section regarding pre-natal services.	---
b. Heart Disease	Present Services: Same as for hypertension above.	Perform routine tests as presently done but add: strep kit to be sent from RHU to reference governate laboratory.
	Additional Services for Consideration: A streptococcal screening program could be set up as a pilot project in two or more limited areas to determine if this disease contributes significantly to heart disease in Egypt.	---
c. Diabetes	Present Services: Diabetes symptoms recognized by physician at this level facility and patients are screened prior to referral. Urine sugar and related urinalysis done.	Routine tests now done. All routine tests as above but add: urinalysis (acetone or ketones, specific gravity, pH), blood glucose, blood urea nitrogen.
	Additional Services for Consideration: Medical indications are that diabetes is endemic although there is not sufficient governate and national data to support this. Governate medical personnel, however, desire that greater attention be given this problem by recognizing and treating diabetes at the lowest level possible. This should prevent unnecessary referral to a higher level medical facility as is presently done thus cutting costs and morbidity. Additional laboratory testing will be required.	---

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Health Unit (w/o beds) and Rural Health Centers (w/beds)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
d. Cancer	Present Services: Routine screening to determine if referral necessary.	All routine tests as presently done.
	Additional Services for Consideration: Additional screening necessary since cancer becoming more prevalent with aging population and present endemic problems. Life expectancy at birth in Egypt has risen 10 years in the last 30 years and should be expected to continue. Two additional simple tests should be added for screening purposes such as that for possible leukemia and cancer of the gastrointestinal tract.	All routine tests as presently done but add: occult blood in stool and white blood count.
2. Endemic Diseases: a. Tuberculosis	Present Services: Tuberculosis is a known severe endemic disease. Physician recognizes symptoms of disease and need for early treatment plus need to screen family members of cases. Referrals are made to chest hospitals. No laboratory tests are presently done for specific screening.	All routine tests as above.
	Additional Services for Consideration: Due to the prevalence of tuberculosis in Egypt, additional support should be provided in the diagnosis, treatment, and follow-up at the lowest possible facility level. Suspect cases should be tested locally to ensure need for referral or for initiation of treatment.	All routine tests as above but add: Ziehl Neilson acid fast for sputum and white blood count.
b. Schistosomiasis	Present Services: Schistosomiasis is the major endemic disease of Egypt. Screening should be continued as presently done. From data gathered e.g., in Gharbia approximately 10% of 250,000 urines and stools done in rural health units are positive.	All routine tests as above.
	Additional Services for Consideration: None except for some additional laboratory support.	All routine tests as above but add: occult blood in stool and urine.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Health Unit (w/o beds) and Rural Health Centers (w/beds)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
c. Intestinal Parasites	Present Services: In addition to the schistosomiasis problem, it is reported in Gharbia that 15% of 220,000 stools for parasites were positive for ascaris. Other problem areas noted are a 15% positive rate for chronic amoebiasis in Beni Suef and a constant occurrence of hookworm in all governates.	All routine tests as above.
	Additional Services for Consideration: Continue the above screening but employ more efficient stool concentration testing using centrifugation so as to find and identify other lower level parasites and additional patients not now being treated.	Consider change in stool concentration methodology.
d. Tetanus	Present Services: Endemic but no testing indicated. Tetanus at the present time is the second most commonly reported disease in Beni Suef for the years 1977-1980.	---
	Additional Services for Consideration: An enhanced immunization program is strongly recommended.	Perform routine tests as is presently done. No additional tests are recommended.
e. Measles	Present Services: Endemic throughout Egypt but accurate reporting system on national level is incomplete. Measles was the fifth most common reportable disease in Beni Suef for 1980.	Routine tests as presently done.
	Additional Services for Consideration: None except an additional laboratory test should be done to rule out complications in other disease areas.	Perform routine tests but add: white blood count.
f. Polio	Present Services: Polio is endemic throughout Egypt at low levels. Physician screening of patient is presently done with referrals as necessary.	Routine tests as presently done.
	Additional Services for Consideration: Refer stools to good reference laboratory facility as indicated.	Perform routine tests but send reference diagnostic specimens to CPHL in Cairo when service available or to other key reference areas.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Health Unit (w/o beds) and Rural Health Centers (w/beds)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
g. Hepatitis	Present Services: Suspected cases found in health unit referred to internal medicine specialist in district or general hospital. No tests performed other than routine testing.	Routine testing now done.
	Additional Services for Consideration: Hepatitis is a known endemic disease in Egypt (it is the number one reported infectious disease for Beni Suef the last five years) and deserves greater attention so treatment can begin as quickly as possible on many patients without referrals to a higher facility thus providing quick and efficient care at lowest level possible. Additional simple tests are needed to support this greater attention at a lower level facility.	Perform routine tests above but add: white blood count, urinalysis (urinary bile pigments), serum bilirubin, and serum transaminase.
h. Cholera	Present Services: Treatment started on suspected cases immediately. (Cholera may become a low level endemic disease since its introduction. No tests are apparently done other than one or more routine tests now done in the health unit.)	Routine tests.
	Additional Services for Consideration: Send suspicious stools to nearest bacteriology laboratory such as the "joint" laboratory for confirmation.	Perform routine tests but add: stool for reference diagnosis to be sent to governate bacteriology laboratory.
i. Typhoid	Present Services: Treat patient on site and/or refer patient to fever or general hospital.	Routine testing now done.
	Additional Services for Consideration: Send suspicious stools and blood to nearest bacteriology laboratory such as the "joint" laboratory for confirmation.	Routine tests but add: stool and serum for reference diagnosis.
j. Other	Present Services: Treat patient on site and/or refer patient to appropriate facility.	Routine tests now done.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Health Unit (w/o beds) and Rural Health Centers (w/beds)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
j. Other (Continued)	Additional Services for Consideration: Physician and/or laboratory person obtain appropriate specimen and refer to appropriate laboratory in higher facility.	Perform routine tests but add: appropriate specimens for reference diagnosis.
3. Routine:		
a. Pre-Natal	Present Services: Patient visits considered as routine. If possible complications noted, patient is referred to hospital.	Routine testing now done.
	Additional Services for Consideration: Handling of complicated pregnancies is a serious problem in rural Egypt. Some rural health units have beds for normal delivery but those that do not send nurses for home delivery. Certain morbidity and mortality problems experienced in the past such as diabetic mothers, mothers with malaria, and obstructed labor (which causes emergency referrals for surgical delivery) can be prevented in the rural health unit with proper pre-natal testing and treatment. (NOTE: According to the Ministry of Health in Cairo, maternal mortality in Egypt is presently 1:1000. In addition, in the report of national morbidity, it is noted that 35% of all female admissions to general hospitals are for deliveries and complications of pregnancies. Furthermore, in the report of national mortality, 3.6% of deaths in women result from pregnancy. Finally, the infant mortality rate is reported to be currently 80:1000, a very serious statistic as the others above.) Due to the above, additional laboratory testing in support of the physician, nurses, and midwives is indicated.	Continue routine tests as above but add: urinalysis (acetone or ketone, specific gravity, pH), blood glucose, blood urea nitrogen, blood typing and grouping, pregnancy test (urine), white blood count, malaria smear, gonorrhea culture for reference diagnosis, and VDRL for syphilis for reference diagnosis.
b. Neo-Natal	Present Services: Patient visits are routine. If problems are evident, patient is referred to higher level facility.	Routine tests as presently done.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Health Unit (w/o beds) and Rural Health Centers (w/beds)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
b. Neo-Natal (Continued)	Additional Services for Consideration: During post-natal visits, a tetanus booster should be given to the mother as well as a diptheria-pertussis-tetanus (DPT) and polio immunization to the child. Instruction should be given to the mother in regard to "child-spacing" so as to assure better maternal-child health. (Note again the high infant mortality rate.) Furthermore, the mother, as indicated may need treatment for post-natal vaginal infections.	Hemoglobin test for mother. Eventually some kind of cervical cytology testing should begin in a central governate laboratory.
c. Visual	Present Services: Patient visits are routine. All patients with eye problems are referred to eye hospitals or hospitals with eye specialists.	None.
	Additional Services for Consideration: None.	None.
4. Malnutrition:	Present Services: Patients admitted for routing screening.	Routine tests now done.
	Additional Services for Consideration: A routine height/weight growth chart should be incorporated into the program of child health services.	None.
5. Other:	---	---
B. Routine (and acute patient care):		
1. Outpatient (includes screening and service above as deemed necessary):		
a. Trauma Minor accidents including burns (auto, home, farming, industrial)	Present Services: Patients admitted for first aid only. If necessary, referral patient is transported to appropriate inpatient facility.	No routine tests usually done.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Health Unit (w/o beds) and Rural Health Centers (w/beds)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
a. Trauma (Continued)	Additional Services for Consideration: None.	None.
Major accidents Including burns (auto, home, farming, industrial)	Present Services: First aid administered if patient brought to rural health unit. Patient is then referred to appropriate level of inpatient care.	None.
b. Minor Surgery	Present Services: Patients admitted for incision and drainage of abscesses, suture of lacerations, and removal of sutures.	None other than routine testing now done.
	Additional Services for Consideration: None, but screen for diabetes as indicated and for infections.	Routine urinalysis including urine sugar, etc., white blood count, and blood glucose.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Health Unit (w/o beds) and Rural Health Centers (w/beds)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
c. Minor Illness:		
Upper Respiratory	Present Services: Patient treated on a routine basis.	Routine tests now done.
	Additional Services for Consideration: None.	None.
Gastroenteritis	Present Services: Patient is treated on a routine basis. Since gastro-enteritis is a major problem in Egypt, patients with such problems are treated symptomatically.	None.
	Additional Services for Consideration: Due to gastroenteritis being a major problem, additional testing should be considered so as to prevent further complications, better treatment, and to ensure proper patient referral.	All urinalysis tests as recommended above, hemoglobin, stool for parasites, white blood count, and sedimentation rate. Also consideration should be given to attaining a stool for culture for referral to a higher level laboratory.
Chronic Disease Maintenance		
(1) TB Drug Maintenance	Present Services: See section on tuberculosis screening above.	---

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Health Unit (w/o beds) and Rural Health Centers (w/beds)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
(1) TB Drug Maintenance (Continued)	Additional Services for Consideration: See section on tuberculosis screening above. In addition the laboratory tests recommended above should be done on a periodic basis to ensure that patient is progressing properly.	See tests recommended above.
(2) Diabetes	Present Services: Routine care administered for known diabetics. See discussion above regarding screening for diabetes.	---
	Additional Services for Consideration: See discussion above regarding screening for diabetes. Periodic testing should be administered to determine if known diabetics receive proper maintenance.	Routine tests but add: urinalysis (acetone or ketones, specific gravity, pH), blood glucose, and blood urea nitrogen.
(3) Other Disease Areas	Present Services: Routine care administered along with routine laboratory tests.	---
	Additional Services for Consideration: None.	None.
Endemic Disease Maintenance (1) Schistosomiasis	Present Services: See discussion above regarding screening.	Routine tests now done.
	Additional Services for Consideration: See discussion above regarding screening.	Routine tests as above but add: occult blood in stool and urine.
(2) Ascaris and Hookworm	Present Services: See discussion above regarding screening for intestinal parasites.	---
	Additional Services for Consideration: See discussion above regarding screening for intestinal parasites.	Consider change in stool concentration methodology.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Health Unit (w/o beds) and Rural Health Centers (w/beds)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
(3) Malaria	Present Services: Malaria is a low level endemic disease in Egypt and does not pose a significant public health problem. Patient is usually referred to fever hospital or endemic disease unit.	---
	Additional Services for Consideration: Patient should be treated in rural health unit after diagnosis in order to prevent unnecessary referral and longer morbidity. Laboratory support should be made available.	Add "thick and thin" blood film test with Giemsa stain (malaria preparation).
(4) Other	No other endemic disease maintenance other than routine treatment.	None.
Other Routine	Same as above.	None.
2. Inpatient (Rural Health Unit w/beds):	Approximately 30% of rural health units or centers contain beds (an average of 10-15 beds per facility).	---
a. Normal Delivery:	Present Services: It has been stated that in the more rural governates the bulk of normal deliveries occur either in the rural health unit with beds or by the staff of the rural health unit doing normal home delivery. Only routine laboratory services are available.	Routine testing as now done.
	Additional Services for Consideration: See discussion above for pre-natal and neo-natal screening. The additional testing as recommended should apply to patients having normal deliveries as an inpatient or in their home on a pre-natal and neo-natal basis.	Ensure tests recommended for pre-natal screening be done prior to delivery. (It is also recommended that an additional health education effort be made to women of child-bearing ages to participate in pre-natal care as soon as they realize they may be pregnant. Proper laboratory testing prior to delivery is essential and should assist in decreasing neo-natal morbidity and mortality. See discussion regarding morbidity and mortality in the section above regarding pre-natal and neo-natal screening.)

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Health Unit (w/o beds) and Rural Health Centers (w/beds)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
b. Complicated Delivery	Present Services: Transfer patient to district or general hospital.	None.
	Additional Services for Consideration: With knowledge of possible complications in delivery, the tests recommended above for pre-natal screening should be done prior to referral of the patient.	Ensure tests recommended for pre-natal screening be done prior to delivery. Ensure the health education effort previously mentioned for normal deliveries includes patients with possible upcoming complications.
c. Minor Surgery	Present Services: Minor surgery in the rural health unit is usually defined as that surgery below the abdomen such as hernia, hydroseal, and incision and drainage of severe abcess.	Routine tests as now done.
	Additional Services for Consideration: Perform the above services but provide additional laboratory support to assist in treating possible complications or further morbidity.	Routine tests as above but add: blood sugar, blood urea nitrogen, white blood count and sedimentation rate.
d. Major Surgery and Trauma (including burns)	Present Services: Patients are referred to higher level facilities.	---
	Additional Services for Consideration: None.	None.
e. Acute and Chronic Illness: Upper and Lower Respiratory	Present Services: Sore throats, colds, pneumonia, influenza, etc., are highly prevalent in rural areas. For example, current statistics show that diseases of the respiratory system are the second most important cause of death in females (18.9%) and the third most important cause of death in males (17.5%). At the present time there is no testing done to determine the severity of respiratory infections of patients and if upgrading of treatment is necessary as a result of these tests. Patients with fevers are usually referred to chest or other facilities.	---

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Health Unit (w/o beds) and Rural Health Centers (w/beds)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
e. Acute and Chronic Illness (Continued)	Additional Services for Consideration: Additional laboratory testing should be considered to determine severity of respiratory infections so as to prevent increased mortality and referrals to higher level facility.	Routine tests now done but add: white blood count, sedimentation rate, differential count, and Ziehl Neilson (if indicated). In turn, specimens for culture and sensitivity should be collected and referred to a microbiology laboratory.
Gastroenterology (Stomach, intestines, pancreas, liver, gall bladder, etc.)	Present Services: Normal treatment instituted and patients held for observation. Patients are referred to higher level facility, usually a general hospital (if complications arise).	---
	Additional Services for Consideration: Diseases of digestive system are the second most important cause for hospital admissions for males (21%) and the fourth most important cause for females (11%). In addition, national mortality due to diseases of the digestive system is number one in both males (25%) and females (28%). Therefore earlier diagnosis and treatment is in order, especially in the lower level facilities such as the rural health unit. Additional laboratory tests would facilitate this early diagnosis and treatment and thus limit referrals to higher level facilities.	Routine tests but add: bile salts in urine (sulphur and iodine), white blood count, sedimentation rate, differential count, blood urea nitrogen, blood sugar, transaminase, and amylase. In turn, blood and stool specimens for cultures should be collected and referred to a microbiology laboratory.
Renal	Present Services: Normal treatment. Observe patients and treat symptomatically. Patients are referred to higher level facility as deemed necessary.	---
	Additional Services for Consideration: Due to endemic schistosomiasis throughout Egypt and resulting urinary tract problems (e.g., in Gharbia 10% of all urines tested are positive for schistosomiasis), renal morbidity is considered a major problem throughout Egypt. Early diagnosis and treatment is needed to prevent more serious renal morbidity and limit present referrals now being made to higher level facilities. Additional laboratory tests are needed to assist in this earlier diagnosis and treatment.	Routine testing but add: urinalysis (add sulphur and iodine), white blood count, sedimentation rate, differential count, and blood urea nitrogen. In turn blood and urine specimens for cultures should be collected and referred to a microbiology laboratory.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Health Unit (w/o beds) and Rural Health Centers (w/beds)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
Cardiovascular	Present Services: Normal treatment and refer to higher level facility in acute cases.	---
	Additional Services for Consideration: None.	None
II. POPULATION SERVED:		
A. Total Population Served:	Estimated 5,000 per unit.	---
B. Estimated Patient Load:		
1. Outpatients:	30 daily.	---
2. Inpatients:	10-15 daily.	---
C. Laboratory Workload:	30-50 specimens daily. (Test load may be higher depending on situation.)	---
III. MANAGEMENT CONSIDERATIONS:		
A. Availability of Trained Personnel:		
1. Laboratory Worker:	Utilized in some units.	---
2. Laboratory Assistant:	Presently utilized in most units since technicians not available in some rural areas.	---
3. Laboratory Technician:	Preferable in rural health unit. (Most rural health units in Gharbia utilize technicians. However, laboratory assistants are used almost exclusively in Beni Suef.)	Laboratory technician would be most desirable for newly recommended procedures. However, a person with training in that capability between the present laboratory assistant and technicians may suffice.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Health Unit (w/o beds) and Rural Health Centers (w/beds)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
4. Professionals:	None utilized in the rural health unit except in the case where physicians may do some testing in the absence of a laboratory assistant or technician.	---
B. Physical Plant:		
1. Electricity:	Not all have electricity but the goal is 100% installation by June 1982.	The choice of tests, test methodology, and equipment is dependent upon the presence or absence of electricity.
2. Telephone:	Telephones are available in 50% of rural health units and only 50% of these work.	Telephones should be installed and made workable in all units not only to call for transport of patients, but to inquire about results of referred specimens.
3. Water:	It is estimated that 98% of units have running water.	None.
4. Gas (or Kerosene):	Most heating is done with kerosene but "buta-gas" is available.	Buta-gas would provide the best means for heat-fixing slides.
5. Equipment:	Limited in all units. Adequate for current manual tests but inadequate for advanced testing planned.	---
6. Space:	Adequate.	---
7. Housekeeping:	Adequate.	---
C. Proximity of Higher Level Facility:	15-30 kilometers to next higher facility.	---
D. Transportation of Patient:	Transportation system underutilized since phones are not always available or working. Referral of patient or pickup of patient may prove to be difficult.	None at present time.
IV. LEGAL OR PROFESSIONAL REQUIREMENTS:	None.	---

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Health Unit (w/o beds) and Rural Health Centers (w/beds)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
V. PUBLIC HEALTH CONSIDERATIONS:		
A. Epidemiology:	Present Services: Not involved.	---
B. Disease Control:	Additional Services for Consideration: Physicians, nurses, and laboratory personnel should be involved in the weekly reporting of diseases and the reporting of all tests results to a central statistical function at the governate level.	Devise system of reporting from unit.
		SUMMARY OF RECOMMENDED LABORATORY SERVICE LEVEL (BY TEST OR PROCEDURE): Urine: Glucose, albumin, ova & parasites, ketones, specific gravity, pH, iodine & sulphur for bile, red cells, pus cells, casts, crystals, pregnancy tests, and occult blood. Blood: Hemoglobin, white blood count, typing and grouping, malaria smear, blood urea nitrogen, blood glucose, transaminase, differential count, sedimentation rate, bilirubin, and amylase. Bacteriology: Acid fast for tuberculosis. Stool: Ova & parasites, and occult blood. Referrals: VDRL, GC, stool, blood, wound and other cultures, and strep kit (for demonstration).

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility School Health Unit or Center (SHU)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
1. TYPE MEDICAL SERVICES RENDERED:		NOTE: Laboratory tests routinely performed in school health units: hemoglobin, urinalysis (sugar, albumin, ova & parasites, red cells, pus cells, casts, and crystals) and stools for parasites.
A. Screening:		
1. Chronic Diseases:		
a. Hypertension	Not applicable. However, physician services are available if problems indicated.	---
b. Heart Disease	Present Services: Suspect child identified and referred to hospital for evaluation. (Extent of rheumatic heart disease unknown in Egypt.)	---
	Additional Services for Consideration: A streptococcal disease investigation project could be set up in one or two school health units to determine extent of disease.	Perform routine tests as presently done, but add: strep kit to be sent from SHU to reference governate laboratory.
c. Diabetes	Operational determination identical to that for the rural health units and centers.	Add tests as indicated for rural health unit and center.
d. Cancer	Usually not applicable except for possible leukemia.	Add white blood count to complement hemoglobin test routinely done.
2. Endemic Diseases:		
a. Tuberculosis b. Schistosomiasis c. Intestinal Parasites d. Tetanus e. Measles	Operational determinations for endemic diseases considered identical to that as listed for rural health units and centers.	Laboratory tests and procedures recommended are identical to those for rural health units and centers.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility School Health Unit or Center (SHU)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
f. Polio	Operational determinations for endemic diseases considered identical to that as listed for rural health units and centers.	Laboratory tests and procedures recommended are identical to those for rural health units and centers.
g. Hepatitis		
h. Cholera		
i. Typhoid		
j. Other		
3. Routine:		
a. Pre-Natal	Not applicable in SHU.	---
b. Neo-Natal	Not applicable in SHU.	---
c. Visual	Present Services: Identical to that now done in rural health units and centers.	---
	Additional Services for Consideration: A routine eye chart examination should be conducted on a periodic basis for all school-aged children.	---
4. Malnutrition:	Operational determination same as for rural health units and centers.	Perform routine tests as now done.
5. Other:	---	---
B. Routine (and acute patient care):		
1. Outpatient (includes screening and service above as deemed necessary):		

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility School Health Unit or Center (SHU)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
a. Trauma Minor Accidents (including burns)	Routine first aid for school accidents. All others are not applicable.	No laboratory tests involved.
Major Accidents	Not applicable.	---
b. Minor Surgery	Not applicable.	---
c. Minor Illness Upper Respiratory	Operational determination considered same as for rural health units and centers.	All tests as recommended for rural health units and centers.
Gastroenteritis		---
Chronic Disease Maintenance	Not applicable.	---
Endemic Disease Maintenance		---
(1) Schistosomiasis	Operational determination considered same as for rural health units and centers.	Recommendations same as for rural health units and centers.
(2) Ascaris and Hookworm		---
(3) Malaria		---
(4) Other		---
Other Routine	Operational determination considered same as for rural health units and centers.	Recommendations same as for rural health units and centers.
2. Inpatient:	Not applicable.	---
II. POPULATION SERVED:		
A. Total Population Served:	10-20,000 unit (in Beni Suef as an example).	---

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility School Health Unit or Center (SHU)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
B. Estimated Patient Load:	50-500 daily depending on size of school area and number of physicians.	---
C. Laboratory Workload:	50-70 specimens daily except during screening periods when more may be done.	---
III. MANAGEMENT CONSIDERATIONS:		
A. Availability of Trained Personnel:		
1. Laboratory Worker:	---	---
2. Laboratory Assistant:	In 9 units (Beni Suef).	---
3. Laboratory Technician:	In 1 unit (Beni Suef). In Gharbia, most units have technicians and goal is to have all technicians in 3 years.	Laboratory technicians would be most desirable in school health unit for newly recommended and more advanced procedures than are presently done. (See summary below regarding recommended laboratory service levels.)
B. Physical Plant:		
1. Electricity:	Available.	---
2. Telephone:	Available.	---
3. Water:	Available.	---
4. Gas:	Butane gas available.	---
5. Equipment:	Adequate for current tests only.	---
6. Space:	Most units visited had inadequate space and/or inadequate work place layout.	Attention should be given to both space and layout.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility School Health Unit or Center (SHU)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
7. Housekeeping:	Housekeeping was considered very poor in most of the school health units observed, although adequate staff appeared to be available to provide cleaner and more orderly medical and laboratory facilities.	Provide authority in school health unit to ensure proper housekeeping and cleanliness.
C. Proximity of Higher Level Facility:	1-5 kilometers.	---
D. Transportation of Patient:	Inadequate.	---
E. Other:	---	---
IV. LEGAL OR PROFESSIONAL REQUIREMENTS:	Not applicable.	---
V. PUBLIC HEALTH CONSIDERATIONS:	Identical determination as that for rural health units and centers except add: A comprehensive immunization program should be instituted and maintained in the school health unit such as: 1. Tetanus in young girls in order to prevent the present neo-natal tetanus problem now highly prevalent in Egypt. 2. Diphtheria, pertussis, polio, and measles in order to prevent outbreaks in schools that will spread to the community.	None. SUMMARY OF RECOMMENDED LABORATORY SERVICE LEVEL (BY TEST OR PROCEDURE): Urine: Glucose, albumin, ova & parasites, ketones, specific gravity, pH, red cells, pus cells, casts, and crystals. Blood: Hemoglobin, white blood count, malaria smear, glucose, differential count, and sedimentation rate.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility School Health Unit or Center (SHU)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
		SUMMARY OF RECOMMENDED LABORATORY SERVICE LEVEL (BY TEST OR PROCEDURE): (Continued) Bacteriology: Ziehl Neilson. Stool: Ova & parasites, and occult blood. Referrals: Strep kit and others to be discussed in November 1982 committee.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Maternal and Child Health Center (with or without beds) (MCH)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
I. TYPE MEDICAL SERVICES RENDERED:		NOTE: Laboratory tests routinely performed in MCH centers: In some governates (no beds): Hemoglobin, and urinalysis (sugar, albumin, ova & parasites, red cells, pus cells, casts, and crystals). MCH Centers (with beds): Above plus stools for parasites.
A. Screening:		
1. Chronic Diseases:		
a. Hypertension	Present Services: Physician screens patient as deemed necessary. No laboratory tests done other than for routine screening (see note on right).	---
	Additional Services for Consideration: Pregnant mothers should be carefully screened and treated for hypertension so as to prevent hypertensive complications of pregnancy. (See discussion regarding pre-natal services in rural health unit.) Additional laboratory testing is necessary in support of this screening. See pre-natal section below regarding recommended tests.	---
b. Heart Disease	Suspect pregnant mother or child identified and referred to hospital for evaluation.	No tests recommended.
c. Diabetes	Because of the severe complications of diabetes in pregnancy to both mother and child see discussion regarding diabetes screening for rural health units. Additional laboratory testing is necessary for screening pregnant women.	Perform routine testing as now done, but add: urinalysis (acetone or ketones, specific gravity, and pH), blood glucose, and blood urea nitrogen.
d. Cancer	Present Services: Routine screening to determine if referral necessary.	---
	Additional Services for Consideration: A more careful screening procedure appears to be in order since cancer is becoming more prevalent in Egypt. (See discussion regarding cancer screening in rural health unit.)	Perform routine testing as indicated, but add: occult blood in stool, and cervical cytology test for reference diagnosis should be considered in the future.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Maternal and Child Health Center (with or without beds) (MCH)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
2. Endemic Diseases:		
a. Tuberculosis	Operational determinations for endemic diseases considered identical to that as listed for rural health units and centers.	Laboratory tests and procedures recommended are identical to those for rural health units and centers.
b. Schistosomiasis		
c. Intestinal Parasites		
d. Tetanus		
e. Measles		
f. Polio		
g. Hepatitis		
h. Cholera		
i. Typhoid		
j. Other		
3. Routine:		
a. Pre-Natal	Present Services: Patient visits considered as routine. If possible complications noted, patient is referred to hospital.	---
	Additional Services for Consideration: The pre-natal screening function is the primary function of the MCH. See the discussion in the pre-natal screening section for the rural health unit. Due to the importance of this function, additional laboratory testing in support of the physician, nurses, and midwives is indicated.	Continue routine tests as above, but add: urinalysis (acetone or ketone, specific gravity and pH), blood glucose, blood urea nitrogen, blood typing and grouping, pregnancy test (urine), white blood count, malaria smear, gonorrhea culture for reference diagnosis, and VDRL for syphilis for reference diagnosis.
b. Neo-Natal	Operational determinations for neo-natal screening considered identical to that as listed for rural health units and centers.	Laboratory tests and other considerations are identical to those as shown for the rural health units and centers.

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Facility Maternal and Child Health Center (with or without beds) (MCH)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
c. Visual	Present Services: All patients, mothers and children, with eye problems are referred to eye hospitals or hospitals with eye specialists.	None.
	Additional Services for Consideration: None.	---
4. Malnutrition:	Operational determinations considered identical to that for rural health units and centers.	Routine tests as now done.
5. Other:	---	---
B. Routine (and acute patient care):		
1. Outpatient (includes screening and service above as deemed necessary):		
a. Trauma	Not applicable - refer patient.	---
b. Minor Surgery	Not applicable - refer patient.	---
c. Minor Illness Upper Respiratory Gastroenteritis Chronic Disease Maintenance Endemic Disease Maintenance Other Routine	Operational determinations considered identical to that for rural health units and centers.	Tests as recommended for rural health unit.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Maternal and Child Health Center (with or without beds) (MCH)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
2. Inpatient (MCH with beds):	According to national statistics, approximately 90% (213 of 236) of MCH's contain beds.	
a. Normal Delivery	Present Services: Conditions for normal delivery very similar to that as shown for rural health units and centers.	---
	Additional Services for Consideration: Discussion regarding pre-natal and neo-natal screening in rural health units and centers apply to the MCH center also.	Ensure tests recommended for pre-natal and neo-natal screening in rural health units and centers be done for the MCH. The health education effort discussed in regard to normal deliveries in rural health units and centers also applies to the MCH center.
b. Complicated Delivery	Present Services: Transfer patient to district or general hospital.	None.
	Additional Services for Consideration: With knowledge of possible complications in delivery, the tests recommended for pre-natal and neo-natal screening in the rural health units and centers should be done prior to referral of the patient.	Ensure tests recommended for pre-natal and neo-natal screening for rural health units and centers be done prior to delivery. Ensure the health education effort mentioned for normal deliveries in the rural health units and centers be instituted in the MCH center to include those patients with possible upcoming complications.
c. Minor Surgery	Not applicable.	---
d. Major Surgery	Not applicable.	---
e. Acute and Chronic Illness	Not applicable.	---
II. POPULATION SERVED:		
A. Total Population Served:	50,000.	---

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Maternal and Child Health Center (with or without beds) (MCH)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
B. Estimated Patient Load:	50 daily.	---
C. Laboratory Workload:	60 specimens daily.	---
III. MANAGEMENT CONSIDERATIONS:		
A. Availability of Trained Personnel:		
1. Laboratory Worker:	None used.	---
2. Laboratory Assistant:	None used.	---
3. Laboratory Technician:	None used. Note: Nurses now perform laboratory work including veni-puncture.	A need for a female laboratory technician is obvious in the MCH center.
B. Physical Plant:		
1. Electricity:	All available but phones do not always work.	---
2. Telephone:		
3. Water:		
4. Gas:		
5. Equipment:	Limited in some MCH centers, and adequate in others.	---
6. Space:	Inadequate in most MCH centers visited.	---
7. Housekeeping:	Varies--very poor in some governates but adequate in others.	---
C. Proximity of Higher Level Facility:	Estimated 1-5 kilometers to general hospital.	---

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Maternal and Child Health Center (with or without beds) (MCH)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
D. Transportation of Patient:	Not always available on a timely basis.	---
E. Other	---	---
IV. LEGAL OR PROFESSIONAL REQUIREMENTS:	Not applicable.	---
V. PUBLIC HEALTH CONSIDERATIONS:	Identical to that for rural health units and centers.	---
		SUMMARY OF RECOMMENDED LABORATORY SERVICE LEVEL (BY TEST OR PROCEDURE): Urine: Glucose, albumin, ova & parasites, ketones, specific gravity, pH, red cells, pus cells, casts, crystals, pregnancy test, and occult blood. Blood: Hemoglobin, white blood count, typing and grouping, differential count, sedimentation rate, malaria smear, blood urea nitrogen, glucose, and bilirubin. Stool: Ova & parasites, and occult blood. Bacteriology: Acid fast for tuberculosis. Referrals: VDRL and GC.

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Facility Rural Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
I. TYPE MEDICAL SERVICES RENDERED:		NOTE: Laboratory tests routinely performed at the present time in rural hospitals are: Hemoglobin, stools for parasites, and urinalysis (sugar, albumin, ova and parasites, red cells, pus cells, casts, and crystals).
A. Screening:	Operational determination identical to that of the rural health units and centers for screening purposes. A value judgment by governate health officials should be made in regard to setting up a streptococcal screening program. However, for the most part, such a program should be administered at the most peripheral point--such as the rural health unit.	All routine tests above as indicated, but add: urinalysis (acetone or ketones, specific gravity, and pH), blood glucose, blood urea nitrogen, occult blood in stool and white blood count.
1. Chronic Diseases:		
a. Hypertension		
b. Heart Disease		
c. Diabetes		
d. Cancer		
e. Other		
2. Endemic Diseases:	Operational determinations are identical to that of the rural health units and centers for screening purposes.	All routine tests above as indicated but add: Ziehl Neilson acid-fast for sputum, white blood count, occult blood (stool and urine), urinary bile pigments, serum bilirubin, serum tranaminase. Consider change in stool concentration methodology. Reference diagnostic specimens as indicated to governate laboratory.
a. Tuberculosis		
b. Schistosomiasis		
c. Intestinal Parasites		
d. Tetanus		
e. Measles		
f. Polio		
g. Hepatitis		
h. Cholera		

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
1. Endemic Diseases: (Continued)		
i. Typhoid		
j. Other		
3. Routine:	Operational determinations are identical to that of the rural health units and centers for screening purposes. (Special attention should be given to the pre-natal and neo-natal discussions.)	Continue routine tests above as indicated, but add: urinalysis (acetone or ketone, specific gravity, and pH), blood glucose, blood urea nitrogen, blood typing and grouping, pregnancy test (urine), white blood count, malaria smear. Gonorrhea culture and VDRL for syphilis for reference diagnosis to governate laboratory.
a. Pre-Natal		
b. Neo-Natal		
c. Visual		
4. Malnutrition:	Present Services: Patients admitted for routine screening.	Routine tests as presently done but add emphasis on hemaglobin and stools for parasites.
	Additional Services for Consideration: A routine height/weight growth chart should be incorporated into the program of child health services.	---
B. Routine (and acute patient care):	NOTE: The rural hospital is the first level where medical specialists are available. Usually represented in this hospital is a surgeon, medical internist, OB/GYN, plus one or more general practitioners. To better utilize the advanced or additional skills as well as to provide better medical treatment additional laboratory services should be made available.	
1. Outpatient (includes screening and service above as deemed necessary):		
a. Trauma Minor Accidents (including burns, auto, home, farming, and industrial)	Present Services: Patients admitted for first aid only. Patient admitted or referred as necessary.	None.
	Additional Services for Consideration: None.	None.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
a. Trauma (Continued) Major Accidents (including burns, auto, home, farming, and industrial)	Present Services: Patients admitted if first aid can be given. Patient is usually referred to higher level facility such as a general hospital.	None.
	Additional Services for Consideration: None.	None.
b. Minor Surgery	Operational determinations identical to that for rural health units and centers. However, it should be reiterated that patients should always be screened for diabetes and infections.	Routine tests, but add: white blood count and blood glucose.
c. Minor Illness Upper Respiratory	Operational determinations identical to that for rural health units and centers.	None.
Gastroenteritis	Operational determinations are identical to those for the rural health units and centers but additional emphasis should be placed on the initiation of oral rehydration of patients, especially since cholera is likely to become endemic in Egypt.	All urinalysis tests as recommended above, hemoglobin, stool for parasites, white blood count, and sedimentation rate. Also consideration should be given to obtaining a stool for culture for referral to a higher level laboratory.
Chronic Disease Maintenance (1) TB Drug Maintenance (2) Diabetes (3) Other	Operational determinations are identical to those for the rural health units and centers.	All routine tests above, but add: urinalysis (acetone or ketone, specific gravity, and pH), blood glucose, blood urea nitrogen, occult blood in stool and urine, and malaria smear.

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Facility Rural Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
c. Minor Illness (Continued) Endemic Disease Maintenance Other Routine	Operational determinations are identical to those for the rural health units and centers.	All routine tests above, but add: urinalysis (acetone or ketones, specific gravity, and pH), blood glucose, blood urea nitrogen, occult blood in stool and urine, and malaria smear.
2. Inpatient:		
a. Normal Delivery	Present Services: It has been stated that in the more rural governates the bulk of normal deliveries occur either in the rural health unit with beds or by the staff of the rural health unit doing normal home deliveries. Only routine laboratory services are available. In the rural hospital, however, normal deliveries include the use of forceps when indicated since a specialist is available.	None.
	Additional Services for Consideration: The operational determination is identical with that of rural health units including the consideration for additional health education efforts.	Ensure tests recommended for pre-natal screening be done prior to delivery.
b. Complicated Delivery	Present Services. Forceps are used as previously mentioned and Caesarian deliveries are done as indicated.	See needs below.
	Additional Services for Consideration: With knowledge of need for forceps and or Caesarian deliveries, the tests recommended for pre-natal screening should be done prior to delivery.	Ensure tests recommended for pre-natal screening be done prior to delivery. Special emphasis should be placed on typing and grouping (and cross-match if needed), hemoglobin, white blood count, differential count, and sedimentation rate. In addition, blood urea nitrogen and blood glucose may be indicated for Caesarian deliveries.
c. Minor Surgery	Present Services: Minor surgery in the rural hospital is usually defined as surgery below the umbilicus, that is, hernia, hydroseal, incision and drainage of severe abscess, and appendectomy.	See below.

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Facility Rural Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
c. Minor Surgery (Continued)	Additional Services for Consideration: Additional laboratory support is needed to assist in treating possible complications and morbidity.	Routine tests as above, but add: blood glucose, blood urea nitrogen, white blood count, and sedimentation rate.
d. Major Surgery and Trauma (including burns)	Patients are referred to higher level facilities.	---
e. Acute and Chronic Illness: Upper and Lower Respiratory Gastroenterology Renal Cardiovascular	Operational determinations are considered identical with that of the rural health units and centers. The additional laboratory tests recommended for the rural health unit are also recommended for the rural hospital.	All routine, but add: white blood count, sedimentation rate, differential count, Ziehl Neilson (if indicated), bile salts in urine, blood urea nitrogen, blood glucose, transaminase, and amylase. In turn, specimens for culture and sensitivity and other blood and stool cultures should be referred to a governate microbiology laboratory.
II. POPULATION SERVED:		
A. Total Population Served:	50,000.	---
B. Estimated Patient Load:		
1. Outpatient:	60 daily.	---
2. Inpatient:	40 daily.	---
C. Laboratory Workload:	40-50 specimens.	---

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility Rural Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
III. MANAGEMENT CONSIDERATIONS:		
A. Availability of Trained Personnel:		
1. Laboratory Worker:	None listed, but usually have 1 worker.	---
2. Laboratory Assistant:	---	Add 1 laboratory assistant.
3. Laboratory Technician:	1 Technician.	Add 1 laboratory technician.
B. Physical Plant:	Adequate except in equipment area.	---
C. Proximity of Higher Level Facility:	10-30 kilometers in Beni Suef. Much less in Port Said.	---
D. Transportation of Patient:	Inadequate due to phone service--most phones do not work properly.	---
IV. LEGAL OR PROFESSIONAL REQUIREMENTS:	Not applicable.	---
V. PUBLIC HEALTH CONSIDERATIONS:	Operational determination identical to that of rural health unit and center.	---
		SUMMARY OF RECOMMENDED LABORATORY SERVICE LEVEL (BY TEST OR PROCEDURE): Urine: Sugar, albumin, ova & parasite, ketones, specific gravity, pH, iodine & sulphur for bile, red cells, pus cells, casts, crystals, pregnancy test, and occult blood. Stool: ova & parasites, and occult blood. Bacteriology: Ziehl Neilson.

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Facility Rural Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
		SUMMARY OF RECOMMENDED LABORATORY SERVICE LEVEL (BY TEST OR PROCEDURE): (Continued) Blood: Hemoglobin, white blood count, typing & grouping, cross-match (for Caesarian deliveries), blood urea nitrogen, differential count, sedimentation rate, trans-aminase, bilirubin, amylase, glucose, and malaria smear. Referrals: VDRL, GC, stool, blood, wound and other cultures, strep for demonstration.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility District Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
I. TYPE MEDICAL SERVICES RENDERED:		NOTE: At the present time the district hospitals are limited in what medical services can be offered due to the lack of adequate laboratory services. However, the medical staff consists of almost all the sub-specialties needed for comprehensive care for a sizable population (150-250,000 people). For the most part, laboratory services are limited to those similar to that offered by the rural hospitals.
A. Screening:		
1. Chronic Diseases:		
a. Hypertension	Present Services: Physician screens patient as deemed necessary. Patient may be a referral or a routine "walk-in." No laboratory tests are done other than those for routine screening as is done in the rural health units and centers (e.g., hemoglobin and simple urinalysis).	
	Additional Services for Consideration: At this level facility special care should be given to hypertension patients not only due to the medical specialties available but to prevent unnecessary morbidity and mortality. Some thought could be given to more comprehensive laboratory support--especially in the area of renal testing.	Routine tests as required but add: blood urea nitrogen (done in some districts but not in others).
b. Heart Disease	Present Services: Routine screening similar to that done in rural health units and centers and rural hospitals.	
	Additional Services for Consideration: Due to the availability of a cardiologist a streptococcal screening program could be set up as a pilot project in at least 2 district hospitals to examine the extent of the relationship of rheumatic heart disease to the incidence of streptococcal sore throat.	Routine tests as present done but add: strep kit to be sent from the hospital to a reference governate laboratory.
c. Diabetes	Present Services: Diabetes symptoms recognized by physician at this level and patients are screened prior to referral or treatment.	Routine. In some districts a blood sugar test is done as well as urine sugar.

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Facility District Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
c. Diabetes (Continued)	Additional Services for Consideration: Since diabetes is recognized as a serious problem in Egypt the district hospital should ensure that a thorough screening procedure be instituted with appropriate laboratory tests available.	All routine tests as now done but ensure: urinalysis (acetone or ketone, specific gravity, and pH), blood sugar, and blood urea nitrogen.
d. Cancer	Present Services: Routine screening.	
	Additional Services for Consideration: Additional screening is necessary since cancer becoming more prevalent with the aging population and present endemic disease problems. Life expectancy at birth in Egypt has risen 10 years in the last 30 years and should be expected to continue. Additional tests should be added for screening purposes such as that for possible leukemia and cancer of the gastrointestinal tract.	All routine tests as presently done but ensure: occult blood in stool and white blood count.
2. Endemic Diseases: a. Tuberculosis	Present Services: Tuberculosis is a known severe endemic disease. Physician recognizes symptoms of disease and need for early treatment plus need to screen family members of cases. Referrals are made to chest hospitals or general hospitals having a chest disease section. No laboratory tests are done for specific screening.	
	Additional Services for Consideration: Due to the prevalence of tuberculosis in Egypt additional support should be provided in the early diagnosis, treatment, and follow-up at the outpatient level. As necessary tuberculosis patients needing bed care should be admitted to the district hospital thus eliminating unnecessary referral to a chest hospital. Laboratory services as appropriate should be provided in the district hospital to assist the physician in diagnosis and early treatment.	All routine tests as done but add: Ziehl Neilson acid fast for sputum, white blood count, and as deemed necessary: reference specimen to send to governate microbiology laboratory for culture and sensitivity testing.

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Facility District Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
b. Schistosomiasis	Present Services: Schistosomiasis is the major endemic disease of Egypt. Screening should be continued as presently done. From data gathered in Gharbia approximately 10% of 250,000 urines and stools done in rural health units are positive. This indicates such a positive rate may be experienced in other facilities receiving outpatients.	All routine services as presently done.
	Additional Services for Consideration: Continue present screening effort but ensure proper laboratory support.	All routine tests but add: occult blood if not presently done.
c. Intestinal Parasites	Present Services: In addition to the schistosomiasis problem it is reported in Gharbia that 15% of 220,000 stools for parasites were positive for ascaris. Other problem areas noted are a 15% positive rate for chronic amoebiasis in Beni Suef and a constant occurrence of hookworm in all governates.	All routine tests now done.
	Additional Services for Consideration: The above screening should be continued but a more efficient stool concentration test using centrifugation should be employed in order to find and identify other lower level parasites and additional patients not now being treated.	Consider a change in stool concentration methodology.
d. Tetanus	Present Services: Endemic but no testing indicated. Tetanus at the present time is the second most commonly reported disease in Beni Suef for the years 1977-1980.	Routine as now done.
	Additional Services for Consideration: An enhanced immunization program is strongly recommended. Patients needing hospitalization should be admitted to the general medical service of the district or general hospital and not a fever hospital.	No additional tests are recommended.

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Facility District Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
e. Measles	Present Services: Measles is endemic throughout Egypt but an accurate reporting system on the national level is incomplete. Measles was the fifth most common reportable disease in Beni Suef for 1980.	Routine tests as presently done.
	Additional Services for Consideration: An enhanced measles immunization program is strongly recommended. Proper laboratory support should be provided in order to rule out complications in other disease areas.	Ensure white blood count done with other routine tests.
f. Polio	Present Services: Polio is endemic throughout Egypt at low levels. Physician screening of patient is presently done with referrals as necessary.	---
	Additional Services for Consideration: An enhanced polio immunization program is strongly recommended. Stools should be sent to a good reference laboratory--possibly the Central Public Health Laboratory in Cairo.	Perform routine tests but refer stool for culture.
g. Hepatitis	Present Services: Suspected cases referred to internal medicine specialist. No tests are performed other than for routine testing.	Routine tests.
	Additional Services for Consideration: Hepatitis is a known endemic disease in Egypt (it has been the number one reported infectious disease for Beni Suef the last five years) and deserves greater attention so treatment can begin as quickly as possible on many patients. If hospitalization is necessary patients should be admitted to the district hospital without further reference--especially to a fever hospital. Laboratory tests now done are inadequate for the emphasis needed.	Perform routine tests but ensure the availability of: all liver function tests including: SGOT, SGPT, alkaline phosphatase, serum protein, creatinine, and serum bilirubin.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility District Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
h. Cholera	Present Services: Treatment is now started on suspected cases immediately. (Cholera may become a low-level endemic disease since its introduction.) No tests are apparently done other than one or more routine tests now done on a screening basis.	Routine tests.
	Additional Services for Consideration: "Suspicious" stools should be sent to the nearest bacteriology laboratory such as the central governate laboratory for confirmation.	Perform all routine tests as necessary and send stool to reference laboratory for cholera confirmation.
i. Typhoid	Present Services: Patients are treated onsite and/or referred to fever or general hospitals.	---
	Additional Services for Consideration: Suspicious stools and blood should be sent to governate bacteriology laboratory for confirmation. If hospitalization is necessary, patient should be admitted to the district hospital in lieu of being sent to a fever hospital as is presently done.	Perform routine testing but send stool and serum specimen to central governate laboratory for reference bacteriology.
j. Other	---	---
3. Routine: a. Pre-Natal	Present Services: Patient visits are considered as routine. If possible complications are noted, patient is admitted to district or referred to a general hospital.	Routine testing such as hemoglobin and urinalysis.
	Additional Services for Consideration: Handling of complicated pregnancies is a serious problem in Egypt--especially in the rural areas. Certain morbidity and mortality problems experienced in the past such as diabetic mothers, mothers with malaria, and obstructed labor (which causes emergency referrals for surgical delivery) can be prevented at the screening level in the	Continue routine testing as now indicated but ensure that the following tests are available to the hospital staff: urinalysis (acetone or ketone, specific gravity, and pH), blood sugar, blood urea nitrogen, blood typing and grouping, pregnancy test (urine), white blood count, malaria smear, gonorrhea culture and VDRL for syphilis specimens for reference bacteriology.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility District Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
a. Pre-Natal (Continued)	district hospital with proper testing and treatment. (Note: According to the Ministry of Health in Cairo, maternal mortality in Egypt is presently 1:1000. In addition, in the report of national morbidity, it is noted that 35% of all female admissions to general hospitals are for deliveries and complications of pregnancies. Furthermore, in the report of national mortality, 3.6% of deaths in women result from pregnancy. Finally, the infant mortality rate is reported to be currently 80:1000—a very serious statistic as the other above.) Due to the above, additional laboratory testing should be instituted in the district hospital laboratory.	
b. Neo-Natal	Present Services: Patient visits are routine. If problems are evident, patient is referred to specialist within hospital.	Routine tests as now done.
	Additional Services for Consideration: During post natal visits a tetanus booster should be given to the mother as well as a diphtheria-pertussis-tetanus (DPT) and polio immunization to the child. Instruction should be given to the mother in regard to "child-spacing" so as to assure better maternal-child health. (Note again the high infant mortality rate.) Furthermore, the mother, as indicated, may need treatment for post natal vaginal infections.	Routine tests as now done including hemoglobin but eventually institute some kind of cervical cytology testing at the central governate laboratory.
c. Visual	Present Services: Patient visits are routine. All patients with eye problems are referred to eye hospitals or hospitals with eye specialists.	None.
	Additional Services for Consideration: If specialists or proper care available in district hospital admit patient without further referral.	None.

Health Care Facility Needs As Related To Certain Operational Criteria and The Determination of Laboratory Service Levels to Support These Needs - Egypt 1982

Facility District Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
4. Malnutrition:	Present Services: Patients admitted for routine screening.	Routine tests now done.
	Additional Services for Consideration: A routine height/weight growth chart should be incorporated into the program of child health services.	None.
5. Other:	---	---
B. Routine (and acute patient care):		
1. Outpatient (includes screening and service above as deemed necessary):		
a. Trauma Minor accidents (including burns, auto, home, farming, and industrial)	Present Services: Patients are admitted for first aid only. If referral is needed patient is admitted within hospital.	No routine tests now done.
	Additional Services for Consideration: None.	
Major accidents (including burns, auto, home, farming, and industrial)	Not applicable since patient is usually admitted and first aid is part of inpatient treatment. Patient may be referred to a general hospital if appropriate.	Not applicable.
b. Minor Surgery	Present Services: Patients are admitted for incisions and drainage of abscess, suture of lacerations, and removal of sutures.	None other than routinely done.
	Additional Services for Consideration: None, but ensure patients are screened for diabetes and infections.	Routine urinalysis including urine sugar, etc., but ensure white blood count and blood sugar.

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Facility District Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
c. Minor Illnesses (Continued) Upper Respiratory	Present Services: Patient treated on a routine basis.	Routine tests.
	Additional Services for Consideration: None.	None.
Gastroenteritis	Present Services: Patient treated on a routine basis. Since gastroenteritis is a major problem in Egypt, patients with such problems are treated symptomatically.	---
	Additional Services for Consideration: In order to prevent further complication and admittance to hospital, additional testing should be considered.	Routine urinalysis, hemoglobin, stool for parasites, etc. Also ensure that tests for white blood count and sedimentation rate be immediately available. Furthermore, as indicated, a stool for culture should be obtained for referral to the governate bacteriology laboratory.

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Facility District Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
c. Minor Illnesses (Continued) Chronic Disease Maintenance		
(1) TB Drug Maintenance	Present Services: See section on tuberculosis screening above.	---
	Additional Services for Consideration: See section on tuberculosis screening above. In addition, the laboratory tests recommended above should be done on a periodic basis to ensure that patient is progressing properly.	See tests recommended above for screening.
(2) Diabetes	Present Services: Routine care administered for known diabetics. See discussion above regarding screening for diabetics.	---
	Additional Services for Consideration: See discussion above regarding screening. Periodic testing should be administered to determine if known diabetics receive proper maintenance.	See tests recommended above for screening.
(3) Other	Continue routine maintenance as presently done.	---

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Facility District Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
c. Minor Illnesses (continued) Endemic Disease Maintenance	Operational determinations are identical to that for rural health units and centers and rural hospitals.	Routine tests now done but ensure: occult blood in stool and urine, "thick and thin" blood film test for malaria, and consider change in stool concentration methodology.
Other Routine	---	---
2. Inpatient:		
a. Normal Delivery	Present Services: Operational determinations identical with that written for the rural hospital.	---
	Additional Services for Consideration: Operational determinations identical with that written for the rural hospital.	Ensure tests recommended for pre-natal screening above be done prior to delivery.
b. Complicated Delivery	Present Services: Forceps are used or Caesarian deliveries are done as indicated.	---
	Additional Services for Consideration: With knowledge of need for forceps and/or Caesarian deliveries the tests recommended for pre-natal screening should be done prior to delivery.	Ensure tests recommended above for pre-natal screening be done prior to delivery. In addition, special attention should be given to the need for typing and grouping (and cross-match if needed), hemoglobin, white blood count, differential count, and sedimentation rate. In addition, blood urea nitrogen and blood sugar may be indicated for Caesarian deliveries.
c. Minor Surgery	Present Services: Minor surgery in the district hospital is usually defined as surgery below the umbilicus, that is hernia, hydrocoal, incision and drainage of severe abscess, and appendectomy.	See below.

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Facility District Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
c. Minor Surgery (Continued)	Additional Services for Consideration: Additional laboratory support is needed to assist in treating possible complications and morbidity.	Routine tests but ensure the availability of: blood sugar, blood urea nitrogen, white blood count, and sedimentation rate.
d. Major Surgery and Trauma (including burns)	Present Services: Major surgery in the district hospital is defined as that surgery below the diaphragm. This does not include thoracic surgery or major cancer surgery which are referred to a large general hospital in a governate or in Cairo or Alexandria.	Routine tests now done.
	Additional Services for Consideration: None recommended in regard to surgery but additional laboratory services should be ensured or considered.	Routine tests now done but ensure: complete blood count (and indices), sedimentation rate, differential count, bile salts in urine, blood urea nitrogen, blood sugar, transaminase (SGOT, SGPT), creatinine, amylase, bilirubin, electrolytes (include sodium, potassium, calcium, bicarbonates, phosphates, etc.), prothrombin time, platelet count, coagulation time, bleeding time, cholesterol, triglycerides, serum protein, (albumin and globulin), typing and grouping, cross-match, alkaline phosphatase, and acid phosphatase. Simple bacteriology: wound and blood cultures (to be done in hospital), other microbiology to be referred to governate reference or central laboratory.
e. Acute and Chronic Illness: Upper and lower respiratory	Present Services: Sore throats, colds, pneumonia, influenza, etc., are highly prevalent in rural areas. For example, current statistics show that diseases of the respiratory system are the seond most important cause of death in females (18.9%) and the third most important cause of death in males (17.5%). At the present time, there is little evidence of the needed presence of testing in district hospitals (e.g., in Beni Suef) to determine the severity of respiratory infections of patients and if upgrading of treatment	---

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Facility District Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
e. Acute and Chronic Illness (Continued)	is necessary as a result of these tests. Patients with fever are usually referred to a chest or fever hospital.	
	Additional Services for Consideration: Additional laboratory testing should be considered to determine severity of respiratory infections so as to present increased mortality, and referrals to higher level facilities.	Routine tests now done but ensure: white blood count, sedimentation rate, differential count, Ziehl Neilson (if indicated). Simple bacteriology: culture and identification with antibiotic sensitivity, tests for common bacterial respiratory pathogens. More advanced bacteriology should be referred to the governate bacteriology laboratory.
Gastroenterology (stomach, intestines, pancreas, liver, gall bladder, etc.)	Present Services: Patients admitted usually are referrals from lower level facilities or those who have a severe problem.	Routine tests including simple hematology and chemistry if available.
	Additional Services for Consideration: Diseases of the digestive system are the second most important cause for hospital admission for males (21%) and the fourth most important cause for females (11%). In addition, national mortality due to diseases of the digestive system is number one in both males (25%) and females (28%). Additional laboratory services should be considered in support of the medical staff in treating patients for this group of problems.	Routine tests now done but ensure: complete blood count (and indices), typing and grouping, cross-matching, prothrombin time, platelet count, coagulation time, bleeding time, sedimentation rate, differential count, bile salts in urine, blood urea nitrogen, blood sugar, transaminase (SGOT, SGPT), creatinine, amylase, bilirubin, electrolytes (sodium, potassium, calcium, bicarbonate, phosphates, etc.), cholesterol, triglycerides, serum protein (albumin and globulin), alkaline phosphatase, acid phosphatase, and uric acid. Simple bacteriology for common enteric pathogens with other appropriate specimens referred on to the governate bacteriology laboratory.
Renal (kidney, urine, and bladder, and genitals)	Present Services: Patients admitted usually are referrals from lower level facilities or those who have a severe problem.	Routine testing.

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Facility District Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
e. Acute and Chronic Illness (Continued)	Additional Services for Consideration: Renal morbidity is considered a major problem throughout Egypt because, not only of highly endemic schistosomiasis, but of problems resulting from other infections. Additional laboratory services are needed at the district hospital level to prevent unnecessary morbidity or higher referrals. Furthermore, because it has been stated by certain health officials that infertility is a problem among the women, certain laboratory tests to support fertility "workups" could be instituted in the future.	Routine testing but ensure: urinalysis (sulphur and iodine), white blood count, sedimentation rate, differential count, blood urea nitrogen. Simple bacteriology: urine cultures for identification and sensitivity, and gonorrhea culture. Referrals of VDRL for syphilis to governate bacteriology laboratory.
Cardiovascular	Present Services: Patients admitted usually are referrals from lower level facilities or those who have a severe problem.	Routine testing now done.
	Additional Services for Consideration: Since this is a major facility level for handling these problems in Egypt, additional laboratory services should be made available for the treatment necessary. Necessary laboratory services are not now available at all district hospitals.	Routine testing and include more complete hematology and chemistry testing as mentioned above for major surgery and gastroenterology.
II. POPULATION SERVED:		
A. Total Population Served:	150 - 250,000.	---
B. Estimated Patient Load:		
1. Outpatients:	150 daily.	---
2. Inpatients:	145 daily.	---
C. Laboratory Workload:	150 specimens daily.	---

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Facility District Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
III. MANAGEMENT CONSIDERATIONS:		
A. Availability of Trained Personnel:		
1. Laboratory Helper:	Need 2 workers.	---
2. Laboratory Assistant:	Need 1 assistant.	---
3. Laboratory Technician:	Need 1-2 technicians.	---
B. Physical Plant:		
1. Electricity:	Available.	---
2. Telephone:	Available.	---
3. Water:	Available.	---
4. Gas:	Available.	---
5. Equipment:	Adequate for present service levels.	---
6. Space:	Adequate.	---
7. Housekeeping:	Adequate.	---
C. Proximity of Higher Level Facility:	5-30 kilometers in Beni Suef.	---
D. Transportation of Patient:	Inadequate (see rural health unit explanation).	---
E. Other	---	---

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Facility District Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
IV. LEGAL OR PROFESSIONAL REQUIREMENTS:	Unknown.	---
V. PUBLIC HEALTH CONSIDERATIONS:	(Identical operational determination to that for rural health units and centers and rural hospitals.) Furthermore, the district hospital's role in disease reporting and epidemiology is most crucial and will be enhanced with the establishment of a bacteriology laboratory component.	---

SUMMARY OF RECOMMENDED LABORATORY SERVICE LEVEL (BY TEST OR PROCEDURE):

Urine: Glucose, albumin, ova & parasites, ketones, specific gravity, pH, iodine & sulphur for bile, red cells, pus cells, casts, crystals, pregnancy test, and occult blood.

Blood: Hemoglobin, CBC & indices (if workload permits), white blood count, typing & grouping, sedimentation rate, differential count, prothrombin time, platelet count, coagulation time, bleeding time, cross-match, malaria smear, blood urea nitrogen, blood glucose, transaminase (SGOT, SGPT), alkaline phosphatase, acid phosphatase, protein, creatinine, bilirubin, amylase, electrolytes (sodium, potassium, calcium, bicarbonate, and phosphates), uric acid, cholesterol, and triglycerides.

Bacteriology: Stools for ova & parasites, occult blood, acid fast for tuberculosis, wound and blood cultures, and enteric pathogens.

Referrals to Microbiology Laboratory: Strep kit, TB culture and sensitivity, stools for cholera confirmation, other cultures, GC culture, and VDRL. Also consider change in stool concentration methodology.

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Facility General Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
I. TYPE MEDICAL SERVICES RENDERED:		NOTE: Procedures and methodologies used vary widely among the general hospitals in Egypt depending on size and location. In Beni Suef the one general hospital, for example, utilizes the procedures and methodologies as shown on pages 48-50 of the United States Project Team's report of November 3-21, 1980. Additional requirements for a general hospital as presented herein are based on facility needs as related to operational criteria in Beni Suef. It must be noted that Beni Suef's general hospital's current laboratory workload is not sufficient to justify more complex, expensive, and labor saving equipment and instrumentation.
A. Screening:		
1. Chronic Diseases:	Operational determinations are identical to those shown for district hospitals.	
a. Hypertension		
b. Heart Disease		
c. Diabetes		
d. Cancer		---
2. Endemic Diseases:		---
a. Tuberculosis		---
b. Schistosomiasis		---
c. Intestinal Parasites		---
d. Tetanus		---
e. Measles		---
f. Polio		---
g. Hepatitis		---
h. Cholera		---
i. Typhoid		---
j. Other		---

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Facility General Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
3. Routine:	Operational determinations are identical to those shown for district hospitals.	---
a. Pre-Natal		---
b. Neo-Natal		---
c. Visual		---
4. Malnutrition:		---
5. Other:		---
B. Routine (and acute patient care):		
1. Outpatient (includes screening and service above as deemed necessary):		
a. Trauma Minor Accidents (including burns, auto, home, farming, and industrial)	Operational determinations are identical to those shown for district hospital.	---
Major accidents (including burns, auto, home, farming and industrial)	Not applicable since patient is usually admitted and first aid is part of inpatient treatment. Patient may be referred to an appropriate facility in Cairo or Alexandria in case of a major burn problem, or for injuries which cause the need for major heart, lung, or brain surgery.	None.
b. Minor Surgery	Operational determinations are identical to those shown for district hospital.	NOTE: All test recommendations for outpatient needs identical to those as recommended for district hospital.

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Facility General Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
c. Minor Illness: Upper Respiratory	Operational determinations are identical to those shown for district hospital.	NOTE: All test recommendations for outpatient needs identical to those as recommended for district hospital.
Gastroenteritis		---
Chronic Disease Maintenance		---
Endemic Disease Maintenance		---
Other Routine		---
2. Inpatient:	Operational determinations are identical to those shown for district hospital except the general hospital should provide more advanced medical services for those patients with possible complications or with conditions not suitable for treatment at a lower level facility such as the district or rural hospital. In essence, the cost of resources required for such treatment in all district hospitals in Egypt would be prohibitive as well as the fact that the medical specialists needed for such treatment are not available--especially in rural areas. (Specialties presently assigned to the Beni Suef General Hospital include by number: Surgeon - 4; Orthopedic - 2; OB-GYN - 3; ENT - 2; Dentists - 3; Internal Med - 3; Pediatrics - 2; Gen. Practice - 10; and Clinical Path. - 1 (part-time). Also 30 residents are utilized with 2 having clinical pathology specialty.) Two specialist areas badly needed are: Hematologist and Pathologist (Tissue). For example, the general hospital should offer better care including laboratory diagnostic services for such things as hematology service, arthritis and thyroid workups, renal and diabetic workups, pathology services such as that for tissue examination, fertility workups, and additional microbiology service, etc.	
a. Normal Delivery		---
b. Complicated Delivery		---
c. Minor Surgery		---
d. Major Surgery and Trauma (including burns)		---
e. Acute and Chronic Illness		---

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Facility General Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
II. POPULATION SERVED:		
A. Total Population Served:	In Beni Suef, 1,200,000. In general, throughout Egypt, it is estimated to range from 125,000 (Port Said) to 500,000 (in Gharbia).	---
B. Estimated Patient Load:		
1. Outpatient:	500 daily (Beni Suef).	---
2. Inpatient:	350 daily (Beni Suef).	---
C. Laboratory Workload:	150 specimens daily (Beni Suef).	---
III. MANAGEMENT CONSIDERATIONS:		
A. Availability of Trained Personnel:		
1. Laboratory Helper:	4 (Beni Suef).	---
2. Laboratory Assistant:	2 (Beni Suef).	---
3. Laboratory Technician:	6 (Beni Suef).	---
	(Note: Also have a pathologist who serves the hospital half of the time and the Joint Laboratories half of the time.)	
B. Physical Plant:	All areas adequate for tests now done.	---
C. Proximity of Higher Level Facility:	Cairo (125+ kilometers) for Beni Suef. In Port Said this distance is far more formidable.	---

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Facility General Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
D. Transportation of Patient:	Inadequate system.	---
E. Other:	---	---
IV. LEGAL OR PROFESSIONAL REQUIREMENTS:	Unknown.	---
V. PUBLIC HEALTH CONSIDERATIONS:		
A. Epidemiology:	Operational determination identical to that of district hospital.	---
B. Disease Control:		---
		SUMMARY OF RECOMMENDED LABORATORY SERVICES LEVELS (BY TEST OR PROCEDURE):
		All tests or procedures recommended for district hospital plus:
		Hematology: Reticulocyte count, fragility test, clotting time, mean cell volume, mean cell hemoglobin concentration, mean cell hemoglobin, aggregation rate & A.T.P. secretion determination, total platelet volume, medium platelet volume, platelet indices, L.E. cell, sickle cell, mononucleosis, rheumatoid arthritis, and rheumatic fever.
		Chemistry: Enzymes (serum lactate dehydrogenase, serum isocitrate dehydrogenase, serum glucose 6 phosphatase hydrogenase, and creatinine phosphokinase), phospholipids, amino acid, thyroid function, blood oxygen, determination of the plasma carbon dioxide combining power & bicarbonate, and serum chloride.
		Microbiology: Assure the availability of a good enteric bacteriology pathogens laboratory including the competency

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Facility General Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
		SUMMARY OF RECOMMENDED LABORATORY SERVICE LEVELS (BY TEST OR PROCEDURE): (Continued) for antibiotic sensitivity testing. (Note: Some governate general hospitals will not have easy access to the central bacteriology laboratory so the hospital should provide such service.)

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Facility Eye Hospital (with or without beds)

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
I. TYPE MEDICAL SERVICES RENDERED:	NOTE: The eye hospital is a separate medical facility dedicated just to patients with eye complaints such as that for glaucoma, cataract, acute conjunctivitis, and trachoma. It was reported in Beni Suef that laboratory services are not available in the eye hospital although some basic laboratory services are available in hospitals having eye disease sections. For example, Beni Suef has only one principal eye hospital, but has eye disease sections with 12-20 beds in each of the 6 district hospitals and in the 1 general hospital.	None recommended. It is believed that laboratory services are not warranted for two reasons: a. The nature of the medical services rendered do not usually require laboratory testing, and b. Adequate laboratory services are available in hospitals having eye disease sections if an occasional need should arise for laboratory support. At some time in the future, governate health officials need to consider the elimination of free-standing eye facilities and consolidation of this service with district and general hospitals. This would provide a more comprehensive service to patients as well as more economical health services.
II. POPULATION SERVED:		
A. Total Population Served:	In Beni Suef it is estimated that 150,000 people are served by the one eye-hospital when taking into account the remaining population served by the district hospitals' eye disease sections.	---
B. Estimated Patient Load:	---	---
C. Laboratory Workload:	None.	---
III. MANAGEMENT CONSIDERATIONS:	Not considered applicable due to recommendation above.	---
IV. LEGAL OR PROFESSIONAL REQUIREMENTS:		---
V. PUBLIC HEALTH CONSIDERATIONS:		---

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Facility Fever Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
I. TYPE MEDICAL SERVICES RENDERED:		NOTE: The fever hospitals visited by the United States Project Team (especially one in Beni Suef) did not offer the comprehensive laboratory procedures that were deemed necessary for proper patient evaluation and treatment. For example, the hemoglobin was not done, and certain simple bacteriology procedures such as that needed for rapid evaluation of such diseases as typhoid, meningitis, or hepatitis, was not available in the hospital's laboratory. Such specimens were sent to the governate's "joint" microbiology laboratory thus causing unnecessary delay in the diagnosis and treatment of the patients.
A. Screening:		
1. Chronic Diseases:	Not applicable.	
2. Endemic Diseases:	Not applicable.	
3. Routine:	Not applicable.	
B. Routine (and acute patient care):		
1. Outpatient:	Not applicable.	---
2. Inpatient:		
a. Normal Delivery	Not applicable.	---
b. Complicated Delivery	Not applicable.	---
c. Minor Surgery	Not applicable.	---
d. Major Surgery	Not applicable.	---
e. Acute and Chronic Illness Upper and Lower Respiratory	NOTE: The fever hospital is a separate medical facility for hospitalization of referral patients with fever and presumably infectious disease (other than for tuberculosis). Also, patients with tetanus are routinely hospitalized, presumably for isolation purposes. The United States Project Team believes that this concept is outmoded and that these patients can receive <u>far better</u> care--and with the needed better laboratory support--in a district or general hospital. However, if it is deemed necessary to maintain these facilities, a major change in both operation and philosophy will be necessary to ensure adequate patient care. For example, the laboratory would	---
Gastroenterology		---

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Facility Fever Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
e. Acute and Chronic Illness (Continued)	need the capacity as that recommended for a district hospital, especially in the area of bacteriology (see recommendations for district hospital). In conclusion, it is the opinion of the United States Project Team that it would be far better to close these facilities and combine this patient care with district and general hospitals. A major consideration in this closing and combining of facilities is the more efficient utilization of very scarce resources, both monies and personnel (especially personnel trained in bacteriology)--as well as getting better patient care as previously discussed.	
Renal	Not applicable.	---
Cardiovascular	Not applicable.	---
II. POPULATION SERVED:		
A. Total Population Served:	In Beni Suef, the two fever hospitals serve a population of 1,200,000.	---
B. Estimated Patient Load:	30 patients daily per hospital (or greater during the cholera epidemic).	---
C. Laboratory Workload:	20 specimens daily.	
III. MANAGEMENT CONSIDERATIONS:		
A. Availability of Trained Personnel:	Adequate.	---
B. Physical Plant:	All criterion adequate.	---

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Facility Fever Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
C. Proximity of Higher Level Facility:	In Beni Suef for example, the "joint" laboratory is located 50 kilometers from one of the fever hospitals. Other hospitals, the district and general hospitals, however, are located in reasonably close proximity to each fever hospital.	---
D. Transportation of Patient:	Inadequate in Beni Suef.	---
E. Other:	Not applicable.	---
IV. LEGAL OR PROFESSIONAL REQUIREMENTS:	Not applicable.	---
V. PUBLIC HEALTH CONSIDERATIONS:	The operational determination is considered identical to that as shown for the rural health unit, rural hospital, and district hospitals.	---

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Facility Chest Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
I. TYPE MEDICAL SERVICES RENDERED:		NOTE: The total laboratory capacity offered in most of the chest hospitals visited in Gharbia and Beni Suef consist of the simple procedures offered in a rural health unit or hospital plus Ziehl Neilson for acid fast sputum and culture for acid fast bacilli. All other laboratory specimens are referred to a general hospital or "joint" microbiology laboratory as necessary.
A. Screening:		
1. Chronic Diseases:	Not applicable.	
2. Endemic Diseases:		
a. Tuberculosis	(See operational determination for rural health units and centers.) Outpatient admitted to the chest hospital for tuberculosis screening are usually referrals. After screening procedures are done, patient may be admitted for tuberculosis "work up."	---
b. All Other Endemic Diseases for Screening:	Not applicable.	---
3. Routine:	Not applicable.	---
4. Malnutrition:		---
5. Other:		---
B. Routine (and acute patient care):		
1. Outpatient (includes screening and service above as deemed necessary):		
a. Trauma	Not applicable.	---
b. Minor Surgery	Not applicable.	---

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Facility Chest Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
c. Minor Illness:		
Upper Respiratory	Not applicable.	---
Gastroenterology	Not applicable.	---
Chronic Disease Maintenance	---	---
(1) TB Drug Maintenance	This is a function of the current chest hospital or chest unit in a hospital involving the routine follow up of patients on TB drugs. After receiving treatment for tuberculosis and discharge from the hospital, patients could receive follow-up care from the rural health unit closer to their home. (See operational determination for tuberculosis screening and TB drug maintenance in the rural health unit and hospitals.)	Routine procedures as deemed necessary.
(2) Diabetes	Not applicable.	---
(3) Hypertension		---
(4) Heart Disease Maintenance		---
(5) Other		---
Endemic Disease Maintenance	Not applicable.	---
Other	Not applicable.	---
2. Inpatient:		
a. Normal Delivery	Not applicable.	---
b. Complicated Delivery		---

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Facility Chest Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
c. Minor Surgery	Not applicable.	---
d. Major Surgery and Trauma (including burns)		---
e. Acute and Chronic Illness		---
Upper and Lower Respiratory	Inpatient care of patients with lower respiratory disease due to Mycobacterium tuberculosis is the sole function of the chest hospital. For the most part, tuberculosis patients are isolated in these hospitals and receive inadequate laboratory support and related hospital care if needed. There are, however, a few general hospitals in Egypt with chest sections, thus showing that it is now acceptable in Egypt as is now done in most Western countries to treat the TB patient in a more comprehensive patient care facility having better medical and laboratory procedures available. The United States Project Team believes that the concept of a separate treatment facility for tuberculosis patients is outmoded and patients would receive better care and better laboratory support in a district or general hospital. It is believed that these facilities should be closed not only due to the current state of the art for tuberculosis treatment, but the need for better utilization of medical resources. An alternative use of such a facility would be to convert--if and when deemed necessary--it to a district or general hospital.	---
Gastroenterology	Not applicable.	---
Renal		---
Cardiovascular		---
Other		---

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Facility Chest Hospital

Operational Criteria	Operational Determination Facility Service Needs or Other Determinations	Laboratory Service Levels Test or Procedures Recommended or Other Considerations
II. POPULATION SERVED:		
A. Total Population Served:	1,200,000 in Beni Suef. (Note: Chest hospitals throughout Egypt serve approximately one-half million to one million people per unit.)	---
B. Estimated Patient Load:	70 patients (Beni Suef) - 50% occupancy.	---
C. Laboratory Workload:	30-50 specimens daily.	---
III. MANAGEMENT CONSIDERATIONS:		
A. Availability of Trained Personnel:		
1. Laboratory Helper:	2 utilized now.	---
2. Laboratory Assistant:	---	---
3. Laboratory Technician:	2 utilized now.	---
B. Physical Plant:	Adequate except for lack of modern and functional biological safety cabinets.	If facilities are not closed as recommended herein, every effort should be made to install biological safety equipment and implement appropriate procedures.
C. Proximity of Higher Level Facility:	Adequate.	---
D. Transportation of Patient:	Inadequate in Beni Suef.	---
E. Other:	Not applicable.	---
IV. LEGAL OR PROFESSIONAL REQUIREMENTS:	Not applicable.	---
V. PUBLIC HEALTH CONSIDERATIONS:	Operational determination identical to that of rural health unit, rural and district hospitals.	---

Assignment of Methodology to Each Test or Procedure Listed in Preceding Facility Summaries - By Facility

It was requested by the Egyptian participants in the project that current methodologies be assigned for each of the tests or procedures recommended in each facility service level. This is done for each type of the facilities (except for Level IV) represented in the previous application of the aforementioned system. Basic assumptions in recommending appropriate methodologies are:

1. Reliable electricity service is available in all facilities--especially the rural health unit.
2. Trained personnel will be made available after a reasonable period of time. A training scheme and related recommendations are discussed further herein.
3. Gas service is available for certain procedures.
4. Appropriate bench space is available. This did not appear to be a problem in most Level I facilities visited.
5. Transport facilities are available for referral specimens.
6. Adequate records system for laboratory data maintenance will be instituted.
7. Adequate storage space and equipment for laboratory kits and reagents, etc., is available.
8. Other as applicable.

The aforementioned recommendations are presented in Tables III, IV, and V for facility levels I, II, and III. There are no recommendations for Level IV (specialty facilities). The reasons for this are evident in the preceding operational determinations regarding chest, fever, and eye hospitals. The Ministry should give close scrutiny to these determinations not only from the standpoint of providing better medical care but for more efficient use of scarce resources.

TABLE III

LABORATORY SERVICE LEVELS AND RECOMMENDED METHODOLOGIES
Level I Facilities

Test or Procedure	Facility				Appropriate Methodology	Principle Equipment Needs
	Rural H/U or Center	Mat. & Child Health Unit	School Health Unit	Rural Hospital		
URINALYSIS:						
Glucose	X	X	X	X	Reagent Strips (Ames)	---
Albumin	X	X	X	X	Reagent Strips (Ames)	---
Ketones	X	X	X	X	Reagent Strips (Ames)	---
pH	X	X	X	X	Reagent Strips (Ames)	---
Bile	X	X	X	X	Reagent Strips (Ames)	---
Specific Gravity	X	X	X	X	Urinometer (specific gravity meter)	Urinometer
Ova and Parasites	X	X	X	X	Manual	Centrifuge & Microscope with light source
Red Cells	X	X	X	X	Manual	Centrifuge & Microscope with light source
White Cells	X	X	X	X	Manual	Centrifuge & Microscope with light source
Casts	X	X	X	X	Manual	Centrifuge & Microscope with light source
Crystals	X	X	X	X	Manual	Centrifuge & Microscope with light source
Occult Blood	X	X	X	X	Reagent Strips (Ames) or Occult Tablet	---
Pregnancy Test	X	X	X	X	Latex Slide Test (various companies)	---
STOOL:						
Ova and Parasites	X	X	X	X	---	---
Occult Blood	X	X	X	X	---	---
BACTERIOLOGY:						
Acid Fast for Tuberculosis	X	X	X	X	Ziehl Neilson	Microscope with light source
BLOOD:						
Hemoglobin	X	X	X	X	Colorimetric (Cyanamethemoglobin)	Colorimeter
White Blood Count	X	X	X	X	Manual (Unopette - B&D)	Microscope with light source
Differential Count	X	X	X	X	Manual	Microscope with light source
Malaria Smear	X	X	X	X	Giemsa Stain or Leishman Stain	Microscope with light source
Typing and Grouping	X	X		X	Manual	Microscope with light source
Sedimentation Rate	X	X	X	X	Manual	---
Cross-match	-	-	-	X	Manual	---
Glucose	X	X	X	X	Colorimetric (manual in school health unit)	Colorimeter and Centrifuge
Urea Nitrogen	X	X	-	X	Colorimetric	Colorimeter and Centrifuge
Transaminase (SGOT)	X	-	-	X	Colorimetric	Colorimeter and Centrifuge
Transaminase (SGPT)	X	-	-	X	Colorimetric	Colorimeter and Centrifuge

TABLE III

LABORATORY SERVICE LEVELS AND RECOMMENDED METHODOLOGIES
Level I Facilities

Test or Procedure	Facility				Appropriate Methodology	Principle Equipment Needs
	Rural H/U or Center	Mat. & Child Health Unit	School Health Unit	Rural Hospital		
BLOOD (Continued):						
Amylase	X	-	-	X	Colorimetric	Colorimeter and Centrifuge
Bilirubin	X	X	-	X	Colorimetric	Colorimeter and Centrifuge
REFERRALS:						
Syphilis Serology	X	X	-	X	Not Applicable. (Refer to Joint Laboratory.)	---
Gonorrhea	X	X	-	X	Not Applicable. (Refer to Joint Laboratory.)	---
Strep Kit	X	-	X	X	Not Applicable. (Refer to Joint Laboratory.)	---
Stool, Blood, Wound and Other Cultures	X	-	-	X	Not Applicable. (Refer to Joint Laboratory.)	---

TABLE IV

LABORATORY SERVICE LEVELS AND RECOMMENDED METHODOLOGIES
Level II Facility (District Hospital)

Test or Procedure	Appropriate Methodology	Principle Equipment Needs
URINALYSIS:		
Glucose	Reagent Strips (Ames)	---
Albumin	Reagent Strips (Ames)	---
Ketones	Reagent Strips (Ames)	---
pH	Reagent Strips (Ames)	---
Bile	Reagent Strips (Ames)	---
Specific Gravity	Specific Gravity Meter	Urinometer
Ova & Parasites	Manual	Centrifuge & Microscope with light source
Red Cells	Manual	Centrifuge & Microscope with light source
White Cells	Manual	Centrifuge & Microscope with light source
Casts	Manual	Centrifuge & Microscope with light source
Crystals	Manual	Centrifuge & Microscope with light source
Occult Blood	Reagent Strips (Ames) or Occult Tablet	---
Pregnancy Test	Latex Slide Test (various companies)	---
BACTERIOLOGY:		
Stools for Ova & Parasites	Manual	Centrifuge & Microscope with light source
Stool for Occult Blood	Manual	Centrifuge & Microscope with light source
Acid Fast for Tuberculosis	Ziehl Neilson	Centrifuge & Microscope with light source
Wound and Blood Cultures	Manual	Centrifuge & Microscope with light source
Enteric Pathogens	Manual	Centrifuge & Microscope with light source

TABLE IV

LABORATORY SERVICE LEVELS AND RECOMMENDED METHODOLOGIES
Level II Facility (District Hospital)

Test or Procedure	Appropriate Methodology	Principle Equipment Needs
BLOOD:		
Hemoglobin	Colorimetric (Cyanmethemoglobin)	Colorimeter
CBC & Indices*	Manual	Microscope with light source, etc.
White Blood Count	Manual (Unopette - B&D)	---
Differential Count	Manual	Microscope with light source, etc.
Malaria Smear	Giemsa or Leishman Stain	Microscope with light source, etc.
Typing & Grouping	Manual	---
Sedimentation Rate	Manual	---
Cross-match	Manual	---
Platelet Count	Manual (Unopette - B&D)	Microscope with light source
Prothrombin Time	Manual (Fibrometer)	Fibrometer
Coagulation Time	Manual	---
Bleeding Time	Manual	---
Blood Glucose	Colorimetric	Colorimeter & Centrifuge
Urea Nitrogen	Colorimetric	Colorimeter & Centrifuge
Transaminase (SGOT, SGPT)	Colorimetric	Colorimeter & Centrifuge
Amylase	Colorimetric	Colorimeter & Centrifuge
Alkaline Phosphatase	Colorimetric	Colorimeter & Centrifuge
Bilirubin	Colorimetric	Colorimeter & Centrifuge
Protein	Colorimetric	Colorimeter & Centrifuge
Creatinine	Colorimetric	Colorimeter & Centrifuge
Uric Acid	Colorimetric	Colorimeter & Centrifuge
Cholesterol	Colorimetric	Colorimeter & Centrifuge
Triglycerides	Colorimetric	Colorimeter & Centrifuge
Electrolytes	---	---
Sodium	Flame Photometer	Flame Photometer
Potassium	Flame Photometer	Flame Photometer
Calcium	Colorimetric	Colorimeter
Bicarbonate	Manual	---
Phosphates	Colorimetric	Colorimeter

TABLE IV

LABORATORY SERVICE LEVELS AND RECOMMENDED METHODOLOGIES
Level II Facility (District Hospital)

Test or Procedure	Appropriate Methodology	Principle Equipment Needs
REFERRALS:		
Strep Kit	Not Applicable. (Refer to Joint Laboratory.)	---
TB Culture & Sensitivity	Not Applicable. (Refer to Joint Laboratory.)	---
Stools for Cholera Confirmation	Not Applicable. (Refer to Joing Laboratory.)	---
Other Cultures	Not Applicable. (Refer to Joint Laboratory.)	---
GC Culture	Not Applicable. (Refer to Joint Laboratory.)	---
VDRL	Not Applicable. (Refer to Joint Laboratory.)	---

NOTE:
*CBC & Indices to be done on semi-automated or automated basis when workload warrants. This procedure listed separately for purposes of work count only.

TABLE V

LABORATORY SERVICE LEVELS AND RECOMMENDED METHODOLOGIES
Level III Facility (General Hospital)

Test or Procedure	Appropriate Methodology	Principle Equipment Needs
URINALYSIS:		
Glucose	Reagent Strips (Ames)	---
Albumin	Reagent Strips (Ames)	---
Ketones	Reagent Strips (Ames)	---
pH	Reagent Strips (Ames)	---
Bile	Reagent Strips (Ames)	---
Specific Gravity	Specific Gravity Meter	Urinometer
Ova & Parasites	Manual	Centrifuge & Microscope with light source
Red Cells	Manual	Centrifuge & Microscope with light source
White Cells	Manual	Centrifuge & Microscope with light source
Casts	Manual	Centrifuge & Microscope with light source
Crystals	Manual	Centrifuge & Microscope with light source
Occult Blood	Reagent Strips (Ames) or Occult Tablet	---
Pregnancy Test	Latex Slide Test (various companies)	---
MICROBIOLOGY:		
Stools for Ova & Parasites	Manual	Centrifuge & Microscope with light source
Stools for Occult Blood	Manual (Occult Tablet)	---
Acid Fast for Tuberculosis	Ziehl Neilson	Centrifuge & Microscope with light source
Wound & Blood Culture	Manual	Centrifuge & Microscope with light source
Enteric Pathogens	Manual	Centrifuge & Microscope with light source
Antibiotic Sensitivity Testing (other than for TB)	Manual	Centrifuge & Microscope with light source

TABLE V

LABORATORY SERVICE LEVELS AND RECOMMENDED METHODOLOGIES
Level III Facility (General Hospital)

Test or Procedure	Appropriate Methodology	Principle Equipment Needs
HEMATOLOGY:		
Hemoglobin	Semi-Automated Cell Counter (J.T. Baker)	Cell Counter
CBC & Indices*	Cell Counter (J.T. Baker)	---
Differential Count	Manual	Microscope with light source
Malaria Smear	Giemsa or Leishman Stain	Microscope with light source
Typing & Grouping	Manual	---
Sedimentation Rate	Manual	---
Cross-match	Manual	---
Platelet Count	Unopette (B&D)	Microscope with light source
Prothrombin Time	Fibrometer	Fibrometer
Coagulation Time	Manual	---
Bleeding Time	Manual	---
Reticulocyte Count	Manual	Microscope with light source
Fragility Test	Manual	---
Clotting Time	Manual	---
Mean Cell Volume	Manual (Calculation from Cell Counter)	---
Mean Cell Hemoglobin	Manual (Calculation from Cell Counter)	---
Mean Cell Hemoglobin Concentration	Manual (Calculation from Cell Counter)	---
Aggregation Rate & ATP Secretion Determination	Aggregometer (Bio-Data Corp.)	Aggregometer
Total Platelet Volume	---	---
Medium Platelet Volume	---	---
Platelet Indices	---	---
L. E. Cell	Manual	---
Sickle Cell	Manual	Microscope with light source
Mononucleosis	Mono Test - Wampole	---
Rheumatoid Arthritis	Latex Slide	Microscope with light source
Rheumatic Fever	Latex Slide	Microscope with light source

TABLE V

LABORATORY SERVICE LEVELS AND RECOMMENDED METHODOLOGIES
Level III Facility (General Hospital)

Test or Procedure	Appropriate Methodology	Principle Equipment Needs
CHEMISTRY:		
Blood Glucose	Colorimetric	Colorimeter
Urea Nitrogen	Colorimetric	Colorimeter
Transaminase (SGOT, SGPT)	Colorimetric	Colorimeter
Amylase	Colorimetric	Colorimeter
Alkaline Phosphatase	Colorimetric	Colorimeter
Bilirubin	Colorimetric	Colorimeter
Protein	Colorimetric	Colorimeter
Creatinine	Colorimetric	Colorimeter
Uric Acid	Colorimetric	Colorimeter
Cholesterol	Colorimetric	Colorimeter
Triglycerides	Colorimetric	Colorimeter
Electrolytes	---	---
Sodium	Flame Photometer	Flame Photometer
Potassium	Flame Photometer	Flame Photometer
Calcium	Colorimetric	Colorimeter
Bicarbonate	Manual	---
Phosphates	Colorimetric	Colorimeter
Serum Lactate Dehydrogenase	Colorimetric	Colorimeter
Serum Isocitrate	---	---
Serum Glucose 6 Phosphatase Dehydrogenase	Manual	---
Creatinine Phosphokinase	Colorimetric	Colorimeter
Phospholipids	Manual	---
Amino Acid	Colorimetric	Colorimeter
Thyroid Function	Manual	---
Blood Oxygen	Semi-Automated	Blood Gas Analyzer
Plasma Carbon Dioxide Combining Power & Bicarbonate	Semi-Automated	Blood Gas Analyzer
Serum Chloride	Colorimetric	Colorimeter

TABLE V

LABORATORY SERVICE LEVELS AND RECOMMENDED METHODOLOGIES
Level III Facility (General Hospital)

Test or Procedure	Appropriate Methodology	Principle Equipment Needs
REFERRALS: Same as listed for District Hospital	Not Applicable. (Send to Joint Laboratories.)	---

NOTE:
*CBC & Indices to be done on semi-automated or automated basis when workload warrants. This procedure listed separately for purposes of work count only.

It should be noted that the tests or procedures and methodologies recommended in Tables III, IV, and V are considered as a preliminary step and will serve as a guideline for the projected November-December 1982 service levels committee meeting in Cairo.

Laboratory Personnel Qualifications and Training

Much is being done by the Ministry to ensure an adequate number of health personnel to serve the country's ever growing population. This is evident in Table VI which shows the Ministry's health personnel in all categories on duty in July 1981. Of significance is the number of Laboratory Technicians on duty in relation to the number of facilities of all types requiring laboratory support (see Table I). For example, there are only 1846 technicians available for over 3800 facilities having laboratories. Not listed is the position of Laboratory Assistant which is the type position or person used in many of the lower level facility laboratories throughout Egypt. The qualifications for the Laboratory Assistant position, however, are minimal and may well be adequate for the current level activity in many of the lower level facilities. However, the training and experience requirements for Laboratory Assistant will in no way provide the competence for the recommended expansion of medical services and accompanying laboratory support--especially that recommended herein for the Level I facilities. There was much discussion regarding such qualifications and training needs during the United States Project Team's last visit to Egypt. In Beni Suef, as an example, it was stated that because the governate had no training institute it was difficult, if not impossible, to attract the number of skilled laboratory personnel needed for their current facility operation. In Gharbia, however, it was stated that all Level I facilities contain at least one Laboratory Technician because of the presence of a technical training institute for Laboratory Technicians. Regardless of institute locations, however, not enough Laboratory Technician graduates appear to be available on an annual basis to provide the necessary staffing for all facility levels--especially for Level I. Table VII, which shows the students and graduates of technical institutes throughout Egypt, depicts this shortage.

One solution to providing the needed skills, and this was discussed at length with the Principal Investigator as well as certain Egyptian members of the

TABLE VI

HEALTH RESOURCES
Health Personnel on Duty
Ministry of Health

Item	Jan/1978	Jan/1979	Jan/1980	Jan/1981
University Level				
Physician	9,966	10,664	12,677	14,177
Dentist	1,848	1,970	2,208	2,617
Pharmacist	1,745	1,944	2,324	2,535
Nurse-Supervisor	153	175	187	273
Physic-Therapist (N.P.)	98	83	--	94
Chemist	308	329	--	450
Other Levels*				
Sanitarian	2,528	2,814	3,222	3,343
Lab Technician	1,362	1,539	1,637	1,846
X-Ray Technician	640	705	756	809
Technical Nurse	133	104	108	92
Dental Technician	--	178	165	179
Nursing Staff	22,770	24,330	25,199	26,723
Health Visitor	4,460	5,485	5,402	5,496

*Technical Institutes and School of M.O.H.

Source: General Dept. of Statistics & Evaluation - Ministry of Health

TABLE VII

STUDENTS AND GRADUATES
OF THE TECHNICAL HEALTH INSTITUTES ACCORDING TO SPECIALTIES

Speciality	76/77	77/78	78/79	79/80	80/81
Students					
Sanitarian	1,756	1,581	1,330	1,512	1,237
Lab Technician	1,197	1,187	1,056	1,611	1,147
X-Ray Technician	542	585	573	782	622
Dental Technician	148	149	134	163	150
Nurses	213	195	166	191	185
Registration & Statistics-Tech.	176	157	129	152	330
Maintenance Technician	280	197	87	90	62
Graduates					
Sanitarian	576	628	408	471	377
Lab Technician	350	426	355	380	384
X-Ray Technician	156	242	194	174	257
Dental Technician	58	69	52	76	68
Nurses	64	68	42	27	52
Registration & Statistics-Tech.	45	60	37	43	48
Maintenance Technician	116	122	35	32	18

Source: General Dept. of Statistics & Evaluation - Ministry of Health

Project, would be to establish an additional qualifications level between the present level of Laboratory Assistant and Laboratory Technician. Such a level, in the opinion of the United States Project Team, would provide the qualifications and training needed to perform the laboratory tests and procedures recommended for Level I facility service expansion. This position could be established as a "Certified" Laboratory Assistant--one step higher than the present Laboratory Assistant, but with additional formal bench training of 6 months to 1 year at the principal general hospital in each governate. Also the technical institute could provide the additional curriculum for this position along with the present technician curriculum. A major advantage in the establishment of this intermediate position is not only provision for the needed skills as previously discussed but it begins to provide a career advancement system for all Egyptians interested in a laboratory career. This opportunity does not appear to exist at the current time since there is such a wide gap in qualifications between the Laboratory Assistant position and that of the Laboratory Technician position which must be trained in an institute in a specific location in the country. Table VIII depicts the present qualifications scheme for Egypt's laboratory personnel. Table IX depicts the qualifications scheme for the additional position recommended. Table X depicts the possible assignment of responsibilities by each position level for all facility levels utilizing the new position.

If Eyypt decides to pursue the above approach various professional organizations in the United States and in Egypt may be available to assist in development of the proper curriculum. Furthermore, the United States Project Team can provide some assistance in this area.

Implementation of Laboratory Service Levels in One or More Governates on a Prototype Basis

Recommendations herein for the expansion of medical and health services with accompanying laboratory support pose a problem in implementation, especially in the Level I facilities. This is due to the evident need of laboratory personnel with more advanced training as well as the need for additional laboratory equipment. For example, the minimum cost of additional equipment that would be needed in Level I facilities in Beni Suef is estimated as follows:

TABLE VIII

PRESENT QUALIFICATIONS SCHEME - LABORATORY PERSONNEL
Egypt - 1981

Laboratory Position	Qualifications Level				
	No Particular Preparation or Training Requirements	Secondary School Plus 3 Months On Job Training	Secondary School Graduate Plus Two Year Institute Program	University Degree	Medical or Other Doctoral Degree
Laboratory Worker	X				
Laboratory Assistant*		X			
Laboratory Technician*			X		
Clinical Pathologist					X
Medical Doctor					X
Other Positions**					
Chemist				X	X
Biochemist				X	X
Microbiologist				X	X
Bacteriologist				X	X
Virologist				X	X
Pharmacists				X	X
Veterinarians				X	X
Agronomists				X	X

NOTES:
*Perform preponderance of tests in Level I-IV facilities excluding CPHL in Cairo and governate "joint" laboratories.

**Earn minimal qualifications with university degree but many doctorates are earned annually by personnel in these position categories.

TABLE IX

PROPOSED QUALIFICATIONS SCHEME ADDING ONE ADDITIONAL
LABORATORY PERSONNEL LEVEL
Egypt - 1982

Laboratory Position	Qualifications Level				
	No Particular Preparation or Training Requirements	Secondary School Plus 3 Months On Job Training	Secondary School Graduate Plus 6 Months - 1 Year Formal Bench Trng.* in General Hospital	Same as Table VIII	Other (See Table VIII)
Laboratory Worker	X				
Laboratory Assistant		X			
"Certified" Laboratory Assistant*			X		
Laboratory Technician				X	
Other (See Table VIII - No Changes Suggested)					

NOTE:
*Bench training in this regard means formal classroom and bench training by qualified degree personnel in general hospital in the areas of more complex testing and use of more advanced equipment and instrumentation. This training could also be done in the institutes. Person would receive certificate at end of successful completion of training.

TABLE X

ASSIGNMENT OF RESPONSIBILITIES FOR EACH
QUALIFICATION OR POSITION LEVEL (SUGGESTED)

Responsibility Levels	Laboratory Worker	Laboratory Assistant	"Certified" Laboratory Assistant	Laboratory Technician	Clinical Pathologist	Medical Doctor	Other (See Table VIII)
1. Laboratory housekeeping (clean benches, apparatus, and dispose of materials, etc.).	X						
2. Perform minor procedure such as urinalysis, stools, and hemoglobin.		X	X	X			
3. Veni-puncture and finger stick.*			X	X			
4. Assist technician and professionals as assigned in more complex work.		X	X	X			
5. Perform procedures of medium complexity or where some formal training is needed in order to perform procedures.			X				
6. Perform all procedures done in facility (e.g., that recommended for RHU, SHU, MCHU, and RH).			X	X			

TABLE X

ASSIGNMENT OF RESPONSIBILITIES FOR EACH
QUALIFICATION OR POSITION LEVEL (SUGGESTED)

Responsibility Levels	Laboratory Worker	Laboratory Assistant	"Certified Laboratory Assistant	Laboratory Technician	Clinical Pathologist	Medical Doctor	Other (See Table VIII)
7. Serve as bench or institute instructor.				X	X	X	X
8. Supervise or perform more advanced procedure in professional field.				X**	X**	X**	X**
9. Serve as laboratory head in general hospital or for joint laboratories--act as consultant.					X***	X***	X***

NOTES:
*Should be transferred from nurse or medical doctor to trained laboratory personnel in order to ensure specimen collection and testing continuity.

**As applicable.

***In a general hospital a clinical pathologist would be more qualified for this position. Otherwise, the assignment should be applicable to the situation. (An example would be the assignment of a microbiologist with a doctorate degree in strictly a joint laboratory placing emphasis on microbiology procedures.

1. First determine the number of facilities:

Level I Facilities	Number
Rural Health Units	84
Rural Health Centers	24
School Health Units	10
Maternal-Child Health Centers	9
Rural Hospitals	4
TOTAL	131

2. Determine equipment needs for each facility from Table III and determine minimum costs from equipment distributors' catalogs.

Equipment	Estimated Minimum Cost
Powered Centrifuge	$200
Light Source for Microscope	110
Colorimeter	700
TOTAL	$1010

3. Estimate total cost for Level I facilities: Estimated cost of $1,010 X 131 facilities = $132,310. It should be noted that this cost estimate may need to be increased on the basis of equipment choices alone. This could be the case if certain equipment is deemed more reliable or more adaptable to all procedures involved. Also costs of kits and reagents for the additional procedures recommended are not included at this time.

Furthermore, the preponderance of personnel in the above facilities are trained as Laboratory Assistants, thus making it difficult for the health directorate to implement new procedures even if equipment is made available. The above obstacles are not insurmountable, however, and in the best interest of Egypt's health delivery system, changes as recommended should be implemented at all facility levels--especially in the Level I area. The following recommendations are offered in this regard:

1. Select one (or two) governates for implementation of the medical and laboratory service levels recommended herein. Beni Suef is highly

recommended due to its present leadership by Dr. Mokhtar Mahmoud Hamza, Director General of the Beni Suef Health Directorate, and the presence of Dr. Samir Gad El Sayad, Clinical Pathologist, Director, Joint Laboratories, Beni Suef. Both officials are deeply interested in the delivery of better medical care with accompanying laboratory support at all levels --especially those of Level I--in order to possibly decrease the rather serious morbidity problems present in Beni Suef.

2. Start a program immediately to train laboratory personnel in Level I facilities to perform the few additional, but more advanced procedures recommended in Table III. In order to accelerate service levels implementation, incentives such as additional pay might be given to technical institute graduates to work in Beni Suef.

3. Establish a technical institute to train "Certified" Laboratory Assistants in Beni Suef General Hospital under the supervision of the present director of the Joint Laboratories.

4. Start a program as soon as applicable to measure the benefits of the expanded medical/health services with accompanying laboratory support in Level I facilities. Certain measures, e.g., reduced referrals, trend in numbers of patients diagnosed by disease category (also with use of laboratory support), number of positive or significant findings, results in laboratory that signify better or more screening efforts necessary, etc., can be used as measurement criteria.

5. Implement laboratory service levels in Level II and III facilities (district and general hospitals only) as recommended in Tables IV and V for Beni Suef. Costs of implementation are considered somewhat lower than in the Level I facilities but the long term benefits to be realized are considered to be substantial.

6. If monies are available, consider Gharbia as the second governate for implementation of the laboratory service levels recommended herein. The problem of personnel qualifications does not exist there since it was pointed out by health officials in Gharbia that all Level I facilities are staffed by qualified Laboratory Technicians. This, for the most part,

is due to (as previously discussed) the presence of a technical institute in Gharbia as well as the governate's larger population and more urban atmosphere.

7. Standardize methodology and equipment in all governate facilities during implementation of laboratory service levels. Identical methodologies and equipment should be available in the aforementioned "Certified" Laboratory Assistant school in the Beni Suef hospital--as well as in the technical institutes located throughout Egypt.

National Epidemiology Function

As mentioned in the November 3-21, 1980 report of the third phase of this project, substantial emphasis needs to be placed on improving the epidemiology function throughout Egypt (pages 70-74). In this report it was recommended that the epidemiology function be given a mandate and procedural framework to establish an ongoing and viable program. This included an effective system of reporting infectious and other important diseases, a rapid system of communication among all levels in the country regarding disease outbreaks and need for epidemiologic assistance, provision of training and placement programs for epidemiologists, the inclusion of the laboratory function to provide the epidemiology function with confirmation and identification of specific disease problems and processes--and the provision for organizational visibility of the epidemiology function at all levels in the country--especially at the ministry level. As necessary, readers of this report should review the discussion regarding epidemiology in the report of November 3-21, 1980.

In addition to the above, it should be the responsibility of the Ministry epidemiology function to initiate and carry out a policy of determining information requirements, the source of these requirements, the system of reporting this information at all levels, and how this information will be used at all levels. A first requirement would be to establish a cornerstone of vital statistics including census by governate, and births and deaths by jurisdiction within governates. Other data related to this would e.g., include such information as causes of death by age and sex, geographical locations, occupation, and population. An finally, morbidity by cause, age, sex, etc., can be

related to the aforementioned data system. In essence, it can be seen that such information flow at all levels--up and down--with accompanying analyses and identification of problems (both prevalent and projected), and taking swift appropriate action, is the primary responsibility of epidemiology. To ensure proper information flow, certain responsibilities for this flow should be assigned to the various governmental levels throughout Egypt as well as the private sector--by statute if necessary. A suggested assignment of such responsibilities is depicted in Table XI.

In addition to ensuring proper information flow, appropriate disease control and other public health initiatives must be carried out at the governate level when deemed necessary. For example, when reports of a suspect disease outbreak comes to the attention of the governate epidemiology function, an investigation must be immediately initiated. This may involve dispatch of field investigators, appropriate specimen collection for laboratory analysis, and appropriate data collection and reporting of the outbreak by these investigators. Also, it may be determined that assistance from the Ministry level is required and communications regarding this should be made accordingly.

A final need--and this has been discussed in previous reports--is the need for trained epidemiologists (both physician and non-physician) at all levels--especially at the governate level. At one time it was thought that an epidemiology training center was to be established at the national level but it was found that this is not the case. The concept of such a center is sound and should be further explored. An interim--and possibly a permanent measure--would be to set up technical institutes in various governates for epidemiology training as is presently done for other professional or semi-professional medical occupations. The United States Project Team is available for consultation in this regard.

TABLE XI

ASSIGNMENT OF RESPONSIBILITIES AT ALL LEVELS FOR EPIDEMIOLOGY INFORMATION SYSTEM

Information Responsibility	Ministry of Health		Governate Health Directorate		Private	
	Epidemiology	Vital Statistics & Other Functions	Epidemiology	Directorate Statistician	Physicians	Laboratories, Clinics, Hospitals, etc.
1. Determine policy regarding information needs, mode and frequency of reporting.	X					
2. Provide national statistics in support of Ministry epidemiology function on a periodic and timely basis.		X*				
3. Analyze national data, prepare interpretation of data, and disseminate information to all levels needing to know.	X					
4. Contact other Ministry functions, governate functions, and private agencies to ensure appropriate action is accomplished.	X					
5. Ensure Ministry policy regarding reportable diseases and other information needs are carried out. Documents that should go to Ministry are: a. Weekly reports of disease b. Significant field investigation reports c. Immunization reports and other reports concerning specific disease programs			X	X		
6. Collect, analyze, interpret and distribute information to all levels in governate needing to know. Send Ministry copies of reports if deemed significant.			X	X		
7. Provide governate with list of reportable diseases on a weekly basis.					X	X
8. Provide positive or significant laboratory results and other data to governate.					X	X

NOTE:
*Includes CPHL data which combines CPHL and governate laboratory data as discussed in previous reports. Also includes data from other Ministry health functions.

CONCLUDING STATEMENT

This report completes the fourth phase of Project 03-337-C. Questions regarding this report will be answered during the next visit to Cairo by the Project Officer.

The United States Project Team appreciates the fine effort and cooperation of the Egyptian members of the project as well as all personnel contacted during this phase of the project. Special thanks are extended to Dr. Hamza, Dr. Samir Gad, and their staff in Beni Suef for the fine assistance rendered in support of this project phase.